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THE TIME-ERROR IN COMPARISON JUDGMENTS

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The method of comparison always has been fundamental to experimental psychology; in one form or another the method has been the basis of a majority of all psychological investigations, both past and present. While there has been a certain amount of theoretical consideration of the nature and characteristics of the comparison judgment, its practical application has overshadowed the discussion of the manner in which it operates.

The essential details may be stated briefly: comparison involves the presentation for judgment of two or more objects which must of necessity be separated in one of the two dimensions, space or time. From these two possibilities evolve the two subdivisions of the method, simultaneous comparison and successive comparison.

Ever since the earliest days of experimental psychology it has been demonstrated that in a series of comparison judgments there appears an effect which is not related to the immediate purpose of the comparison, but which occurs as a result of the fact of separation, spatial or temporal. A relative displacement in the direction of over- or underestimation of the stimulus-object appearing in one or the other spatial or temporal position (for example, in simultaneous presentation, the right-hand object, in successive presentation, the second object) is referred to as the space-error or time-error.

The earliest formulation of the concept of these errors was made by Fechner (11), and the terminology developed at that time remains unchanged. Thus, a positive time-error¹ indicates an underestima-

¹ The customary German term, *Zeitfehler*, was never used by Fechner; he employed throughout the more laborious phrase "constant error of time."

tion of the second stimulus, while the negative time-error refers to an overestimation of the second stimulus.

So insistent are the time- and space-errors that any thorough hypothesis concerning the comparison judgment must involve some consideration of them, and every experiment carried on by means of the comparison methods should recognize their presence. A very lively recent interest in the time-error as a problem for inquiry in itself has served to revive and to complicate a traditional discussion. The present paper is intended to sketch the evidence from the past which is relevant to the modern status of the problem and to indicate the nature of the more recent contributions. The treatment accorded to the time-error in experimental methodology will be summarized; considerations of the time-error as a phenomenon worthy of investigation in itself will be treated more fully, and reference will be made to the more general theory of comparison wherever it is necessary to the development of the topic. The emphasis will be upon broader lines of development of the problem rather than upon an exhaustive survey of the literature.

THE TIME-ERROR AS CONSTANT ERROR

It was Fechner in his work with lifted weights who first made a systematic observation of the appearance of time-errors. He noted a persistent tendency for the subject to overestimate the second weight, a tendency manifested by a relatively larger number of judgments of the "Heavier" category on that weight. In order that this negative time-error might not distort the final experimental results, Fechner introduced a correction for it (11, 104 ff.). The use of both time-orders, so that every pair of stimuli was presented an equal number of times in both possible temporal sequences, and the averaging of the results of the two series, introduced two opposed and (by implication) equal asymmetries which compensated each other and thus eliminated the effect of the time-error; the further condition was that the time interval should be the same throughout.

This procedure was accepted as fundamental and came to be universally accepted in psychophysical method, not only in the Method of Right and Wrong Cases, but also in every procedure which involved a temporal dimension in the presentation of the stimuli. In the Method of Average Error (29, 17, 15), the Method of Limits (7, 43, 50), and the Method of Equal Sense Distances (50, 30) the averaging of results from all possible time-orders was considered

necessary for the elimination of the time-error. Titchener in 1905 demanded the same procedures (39, 40).

However, it has been in the Method of Right and Wrong Cases that the problem of the time-error has received the most attention. In the process of revision which resulted in the Method of Constant Stimuli, Urban took into consideration the problem of the time-error; his two important generalizations may be quoted. (1) "It will be noticed that the series of comparison weights is not equally extended above and below the standard. The motive for the choice of this series of comparison weights was that it was observed in the preliminary experiments that all the subjects had a tendency to give a majority of 'heavier'-judgments on the comparison of 100 with 100 grams. It does not seem profitable to use an equal number of positive and negative differences, because one would get a very large percentage of 'heavier'-judgments in the upper part of the series and a small percentage of 'lighter'-judgments in the lower part, or one would suffer from the opposite inconvenience as the case may be one of overestimation or underestimation of the second stimulus." (2) Quoting a current explanation of the time-error (that of Lehmann, 27, as below), Urban stated that "besides fatigue and the shifting of attention, there is the possibility that the stimulation produced by the first lifting does not die out immediately, but that it interferes with the next lifting, so as to inhibit or reinforce it. . . . An influence of this type will not impair the experiments, but it will go in as a constant factor. . . . This influence . . . will be distributed equally over all parts of the series of experiments." (41, 10 ff.)

Modern usage of the Method of Constant Stimuli generally follows the dicta of Urban; the standard stimulus is displaced upward with respect to the mid-point of the comparison series, and the time-error, assumed to be everywhere of the same effectiveness, is merely recognized (*e.g.*, "the time-error was present in the first order") or totally disregarded, its disposal being determined by the pleasure of the reporting experimenter.

THE TIME-ERROR AS A PHENOMENON

When Fechner became concerned with a theoretical consideration of the time-error he developed the so-called "memory-image" theory, based on principles which may be traced back to Aristotle. The fundamental case of comparison is that of the simultaneous comparison, in which two coexistent sensations are judged. The successive

comparison, on the other hand, involves the comparison of a present (second) sensation with the image of an earlier (first) stimulus. Only the addition of a concept of the 'fading' or 'sinking' of the image was necessary for the application of this traditional doctrine to the facts of the negative time-error. This fading of the image involved a decrease in the effective comparison value of the first stimulus; this was exactly what was indicated in the overestimation of the second stimulus (11, 88 ff., 306 ff.).

In developing experimental verification for the doctrine of the memory image, Fechner introduced the procedure which is still employed in studies of the time-error. It was obvious that the fading of the memory image was an event which had temporal extension, or which took place in time, and therefore the amount of decrease in the effective value of the first stimulus stood in some functional relationship to the amount of time which had elapsed since the appearance of that stimulus. The longer the time interval between the comparison stimuli, the greater would be the decrease in the strength of the image, and, therefore, the greater should be the negative time-error. Thus it might be possible to fractionate the fading of the memory image.

The present writer suggests the term *p-function* (*p*-*Pause*-interval) as an expression of the variation in the time-error (direction and amount) with a change in the length of the time interval between the successive stimuli.

When he employed four rates of weight-lifting Fechner found that the relative amount of overestimation of the second weight (negative time-error) increased with an increase in the length of the interval, becoming greatest at the longest interval (11, 306 ff.). The experimental evidence supported the memory image hypothesis, and the theory prevailed for nearly half a century. Typical restatements of the theory, supported by experimental evidence, are those of Stärke (38), Wolfe (48), and Lehmann (25).

An insight on the part of Wolfe (48) into the possible relationships between the problems of memory and of the time-error led to complications. Wolfe had determined a *p*-function of the time-error for judgments of tone, and had obtained results comparable with the usual findings. Wolfe retained the memory image theory, but expressed it in such a way that the image became the modus of recognition, which in turn made possible the comparison judgment. A sensation was compared with an image which might originate in one of two ways: (1) it might have persisted in consciousness continu-

ously since the original impression, or (2) it might be aroused by the second sensation. Thus the second stimulus assumed a dual rôle, since it excited the appropriate sensation and at the same time aroused the image of an earlier sensation. This second possibility contained the important implication that in the interval between the successive stimuli an image was not necessarily present in consciousness.

This aspect of the problem was made explicit by Lehmann (25, 26). In experimental studies, Lehmann had obtained the customary p-function of time-errors for tones and for brightnesses; his statement of the memory image theory (26, 205) was in complete accord with the Fechnerian formulation. But Lehmann had noted, not only that the image was frequently unobservable in introspection, but also that smaller time-errors occurred when the subjects made no attempt to concentrate on the image in the interval between the stimuli. For Lehmann, then, the image passed from conscious control in the comparison judgment; the image was an autonomous unit which might be either conscious or unconscious. But it was still an image, and it retained an effective value which made possible a comparison and which decreased as the time interval increased.

Lehmann attempted to extend the principle of the memory image to all memory phenomena, a typical endeavor to construct the 'higher mental processes' in elementaristic terms; the result was the Lehmann-Höffding controversy. Höffding (18) insisted that the comparison judgment was an immediate and unique experience, characterized by the quality of 'known' (*Bewusstheit*). The phenomenal experience was not one of addition of sensation to image nor of any surrogate for this process. Experimental support was available in Lehmann's own failure to find introspective evidence of a mediating image.

A series of experimental studies served to crystallize this persistent phenomenological criticism. Bentley (6) determined a p-function of time-errors for brightnesses and found the usual increase in the "tendency of the memory to lighten" as the interval increased. However, from the introspective reports which he obtained, Bentley was led to suspect that the phenomenal strength of the image might not, and frequently did not, correspond to the effective value of that image as measured in the objective results, that is, in the p-function. Angell worked with a variety of stimuli (1, 2, 3, 4) and developed further criticism of the memory image theory; here again the introspective reports were emphasized, and it was noted that the image was only a minor element in the mass of associative and supple-

mentary material present in consciousness during the interval between the first and second stimuli. Whipple followed with similar experiments (45, 46) which concluded the direct attacks upon the memory image theory. Whipple pointed out that during the interval after the presentation of the first stimulus the conscious field was composed of a whole mass of associative experience (*cf.* Angell). When the second stimulus appeared, the impression of its relation to the first was immediate (*cf.* Höffding); the judgment was a phenomenal datum independent of any direct reference to the background (including the image) upon which it appeared. That is, the functional importance of the memory image was denied, so that the question as to its phenomenological existence became irrelevant.

While the memory image theory was being disputed, there appeared a suggestion of a new formulation of the problem. Müller and Martin (31) reported a very thorough analysis of the various anomalies or asymmetries of judgments which appeared in a series of judgments in the method of successive comparison. The plurality of asymmetries was first indicated in Müller and Martin's observation that the averaging of results from two time orders did not eliminate entirely the time-error.

Müller and Martin were able to isolate statistically three distinct factors each responsible for a tendency toward either overestimation or underestimation of a comparison stimulus. There was the type tendency (31, 40 ff., 113 ff.), arising from the physical constitution of the subject (muscular or non-muscular). The absolute tendency (43 ff., 64 ff.) was the inclination on the part of the subject to make a judgment on the second stimulus without reference to the first; the explanation was in terms of mental or muscular "set." Finally there was the Fechnerian time-error (17 ff., 58 ff.), which was explained in physiological terms such as fatigue and a 'warming-up' type of facilitation (63, 117 ff.). The Müller and Martin theory of the time-error was never critically evaluated; only recently Pratt (35) has pointed out that although fatigue may be a reasonable assumption in the case of lifted weights, it is not applicable to the case of other stimuli.

With the memory image theory in disrepute, Lehmann realized that the empirical facts persisted, and attempted to develop a new theory of the time-error, this time in physiological terms (27). The first stimulus was assumed to set up an excitation which did not immediately disappear. When the second stimulus appeared the excitation which it induced was affected by the residuum from the

first excitation, which served either to inhibit (positive time-error) or to facilitate (negative time-error) the second excitation. Lehmann devised a mathematical formula (which he likened to the Ebbinghaus curve for the Law of Forgetting) to express the dependence of this facilitation-inhibition process upon the length of the time interval. However, the theory was never elaborated; the interest in the problem of the p-function was on the wane.

Indeed, for years the facts of the time-error were not taken into consideration in speculations concerning the nature of the comparison judgment. Just as the Würzburg school, in the denial of the sufficiency of the sensationalistic elements, hypothesized conscious elements of a higher order, so the comparison judgment was explained in terms of transition sensations, relational elements, and so forth (cf., for example, 37, 20, 28, 9).²

In 1923 Köhler published the paper which is responsible for the present interest in the time-error (22). The work was stimulated by some comments made by Borak (8), who had noted the appearance of time-errors and who had made rough p-function determinations. Borak had attempted to apply Lehmann's theory of facilitation-inhibition, and, failing in that, had introduced a concept of a special conscious element best characterized as an attentional factor.

Köhler's purpose was to devise for the time-error an explanation suitable to the general Gestalt conception of the comparison judgment; Koffka's statement is typical: "Comparison is no longer an act supervening upon the given sensations. The question how the two sensations can be compared no longer exists, because the two sensations do not exist" (21, 542). In the case of the time-error Köhler made the criticism that the memory image and the other earlier theories all had assumed the continuation of some effect from the first stimulus, which perseveration must of necessity be phrased in terms identical with those which defined the end-points, that is, the stimuli. To replace the fractional memory image theory Köhler sought to introduce a concept of a total process best considered configurationally.

The experimental contribution made by Köhler was the determination of his well-known p-function of the time-error; the stimuli were auditory intensities. With the shorter time intervals (0-3 seconds) the time-error was found to be positive; thereafter (3-12 seconds) the time-error was increasingly negative. The explanation

² More complete accounts of the history of the theories of the comparison judgment may be found in Fernberger (12) or Köhler (22).

introduced the trace theory, which has been restated so frequently that only brief mention need be made of it. The effect of the first stimulus was an electro-chemical process in the appropriate brain region; the conscious correlate of this process was the phenomenal experience of the first stimulus. With the cessation of the stimulus, the brain process did not cease immediately; by a naturally induced process of dissimilation (dispersion of ions) the region approached its original condition. This phase of activity was a non-process condition, that is, it did not have a conscious correlate. The slowly dispersing ionic concentration represented the state of excitation; it was a *stille Bild* of that condition. The effect of the second stimulus was similar to that of the first; because of the sinking of the trace, however, the effect was greater than would have been the case had there been no sinking. That is, the dynamic transition which mediated the comparison judgment failed to correspond to the objective stimulus conditions, and an overestimation of the second stimulus was favored. This was the fate of the trace when the interval was three seconds or longer. In a shorter interval, when the sinking had not yet commenced, there was a brief change of the trace in the opposite direction, a process which was represented by the positive time-error.

Supplementary to the concept of the trace was the sediment hypothesis, which suggested the successive layering of traces to account for the evolution of a general level of reference upon which all experience appears, and to relate the problem of the time-error with the field of memory phenomena.

Pikler (34) criticized Köhler's theory on the grounds that under the conditions of the trace it would be impossible, in a series of three successive stimuli, to compare the third with the first, since the second stimulus would destroy the trace of the first. It may be noted that there is experimental evidence concerning this special experimental arrangement; Guilford and Park (16) have recorded the effects of an interpolated stimulus upon the succeeding stimulus.

Another difficulty in the Köhler theory was pointed out by Lauenstein (24), namely, the impossibility of accounting for successive comparison where the stimulation involves two different brain fields. Lauenstein suggested a modification of the Köhler theory wherein the dynamic transition took place not between two successive states of the same brain region, but rather between two different fields, with the contour or differential field, intermediate to and deter-

mined by the stimulated regions, assuming the rôle of dynamic transition.

Lauenstein's experimental work consisted of the presentation of comparison stimuli (auditory intensities) upon a continuous background (likewise auditory) either much above or much below the intensive level of the comparison stimuli. With the weaker or softer background, the p-function of the time-error followed the same direction as that determined by Köhler. With the loud background, however, the time-error was everywhere positive, increasingly so with the longer intervals.

These results were interpreted by Lauenstein as a verification of his hypothesis that adjacent traces assimilate toward each other. The different direction of the p-functions under the two background conditions indicated two different directions of the process of assimilation.

Pratt (35) insisted that Lauenstein's generalizations were based upon a special limited experimental situation, and that the process of assimilation to an artificial background did not necessarily correspond to assimilation to a natural (unfilled) background. Making use of judgments upon auditory intensities and lifted weights, with and without an interpolated stimulus between the comparison stimuli, Pratt found that the negative time-error was greater in the case of interpolation of a weak sound or light weight than it was in the "normal" case, in which no interpolated stimulus was present. In other words, there was less assimilation to an empty background than to a slightly filled background; the result is exactly the reverse of the expectation from Lauenstein's theory. The conclusion, that assimilation may obtain in Lauenstein's results but that it is not therefore universally applicable, is entirely justified. It remains to be demonstrated whether, with respect to the time-errors, interpolation and a continuous background are strictly comparable experimental conditions.

Wada (42) made a lengthy study of various conditions of the p-function of time-errors for pitch, the more important results of which may be summarized. (1) The general form of the p-function was comparable to that obtained by Köhler for intensity, except that longer intervals (of the order of one minute) the time-error became less negative or even positive. (2) Absolute pitch (the frequency level of the comparison stimuli, *e.g.*, 300, 500, 600 dv.) had a marked effect upon the p-function of the time-error, the entire curve rising (negative to positive time-errors) as the pitch became higher. (3) The time-error for a certain time interval depended upon the other intervals included in the same experimental series. (4) A

change in the instructed attitude of the subject ("Naïve" to "Introspective") produced a marked shift in the p-function.

In explanation of the time-error Wada suggested a theory which is best described as 'attentional.' "In the case of successive comparison we can assume that consciousness is more strongly directed to the second stimulus. . . . The directional tendency of consciousness is more upon the second stimulus . . . which is somehow 'überschätzen' ".(42, 532).

Needham (33) attempted to evaluate Köhler's criterion that the observers must be "naïve" in order to obtain the most satisfactory results in the determination of a p-function. The form of the p-function was noted as it was obtained at each of a number of experimental sessions. It was found that Köhler's generalization obtained (although only roughly) in the case of the unpracticed observer, but that the repetition of the experiment produced marked alterations in the p-function; after sufficient experimentation the curve of the p-function might be completely reversed. The order of presentation of the stimuli (auditory intensities), standard-comparison or comparison-standard, had no effect upon the original form of the p-function, although the changes with repetition were markedly different.

Kreezer (23) sought to clarify the confusion as to whether the time-error was of central or of peripheral origin. He became involved in the inter-relationships of space- and time-errors, and was able to demonstrate the dependence of the space-errors upon the spatial separation of the stimuli. In the same manner Jacobs (19) determined for the space-errors with different separations of the stimuli a function comparable to those determined for the time-errors with different intervals.

Woodrow (49), working with lifted weights, developed a method of presentation wherein standard-comparison pairs of varying absolute weights were intermixed. Fractionation of the results indicated that as the variable standard became heavier the "time-order error" changed from positive to zero, and then became increasingly negative. Woodrow suggested as the cause of the time-error the production by the first stimulus of a "set" of a certain intensive level, describable as an expectation of a second stimulus of a certain intensity. The "sinking" of this "set" accounts for the negative time-error. This addition of the trace theory to the Müller-Schumann (32) concept of "set" had been made previously by Fernberger to account for the appearance of time-errors in the method of absolute judgment (13). Wever

and Zener (44) likewise had noted a time-error in the absolute method, and had referred it to Köhler's hypothesis of sediment.

Pratt (36) obtained absolute judgments of auditory intensities at a number of different intensive levels and found that a shift from a higher to a lower level produced a shift from a negative to a positive time-error. This is the same shift which Woodrow found in the change from light to heavy weights, although it does not agree with Wada's shift from low to high pitch. Pratt's theory is a principle of contrast.

DISCUSSION AND SUMMARY

Theories of the time-error fall into three general groups. In the first place, it is apparent that the task of laying the ghost of the memory image theory has not yet been accomplished; Köhler's trace may be interpreted as the Fechnerian memory image at a higher level of physiological sophistication. Likewise, Lehmann's facilitation-inhibition and Lauenstein's assimilation both involve the change in time of some residuum from the first stimulation. Secondly there has reappeared the concept of "set," first suggested by Müller and Schumann (32) and taken over by Müller and Martin to account for the "absolute impression." The significance of the references to this principle is enhanced by the observations of an asymmetry comparable to the time-error in the absolute judgment. Most frequently the application of the concept of "set" is accomplished by the supplementation of some process of "sinking" or "fading" during the interval after the first stimulus. Thirdly, reference to some attentional factor is sufficiently persistent to indicate the possibility of some basis for the proposal.

The writer suggests certain conditions which should be considered in a thorough hypothesis of the time-error; all of the suggestions are based upon the above review. (1) A single explanatory concept should suffice for both positive and negative time-errors. The memory image theory, and all theories which account for the negative time-error in terms of some decrease in the effective value of the first stimulus, fail to accomplish this; thus it becomes necessary to hypothesize further to account for the positive time-error. The appearance of cycles in the p -function of the time-error, so that with a sufficiently long interval the time-error may become less rather than more negative (noted by Lehmann, Wolfe, Whipple, and Wada, among others), is an added argument against the memory image type of theory. A one-dimensional explanation of both positive and negative time-errors seems both preferable and plausible.

(2) The validity of the temporal formulation of the problem must be determined. The time-error has been always assumed to be a direct effect of the separation of two stimuli in time. The appearance of entirely comparable effects in methods which involve only a single stimulus suggests that the term time-error may be completely misleading.

(3) Theories of the processes underlying the time-error easily become too emphatic of an intensive formulation of the phenomenon. The process of "fading" or "sinking" lends itself most readily to intensive phraseology, although it is not sufficiently definitive in application to qualitative judgments. For example, a color may lose with respect to brightness, but a comparable loss in hue has no definite meaning as to either one direction or the nature of the shift.³ It is becoming more and more evident that time-errors may appear in an endless variety of stimulus situations. Pitch (Wada) is one of the best examples, but time-errors are also reported in judgments of taste and of smell (Fodor and Happisch, 14) and of pleasantness and unpleasantness (*cf.* Beebe-Center, 5).

(4) There is a strong possibility that introspective evidence may become valuable in the explanation of the p-function of the time-error. It is of interest to note that both Köhler and Lauenstein were very much concerned with the phenomenology of the comparison judgment in general, although nowhere did they emphasize possible phenomenological differences when the time intervals were different.

On the methodological side there remain a number of problems.⁴ The relationships of time-errors and limens has not been finally determined. There is a question as to the limits in a series of comparison stimuli within which the time-error is present. Müller (30) remarked long ago that only with small stimulus differences does the time-error appear. The criticism of many theories, as is pointed out by Woodrow, is that it is impossible to conceive, for example, of the sinking of the trace of a 200 gram weight to such an extent that it might be judged lighter than a 50 gram weight. It has been noted frequently that the over- or underestimation is most marked in cases where the stimuli are objectively equal, but the extent of this dependence has not been determined.

Finally, there is the recurrent suggestion that the problem of the time-error has some bearing upon memory phenomena; with the

³ Cf. Angell (1, 69).

⁴ As an example of the present status of the time-error in psychophysical theory, see Culler (10).

exception of Köhler, recent theorists have tended to avoid the consideration of this possibility. Recent advances in both fields cannot be said to eliminate this aspect of the problem, and a future establishment of some such relationship seems plausible. Meanwhile, there are sufficient 'islands' in the experimental data concerning the time-error and its conditions to warrant the reservation of judgment.

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INTERFERENCES IN READING

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Reading as a basic skill underlies many intellectual activities in, as well as out of, school. The distinct moral and educational advantages accruing to people from a good mastery of graphic symbolism have partly molded those educational policies which attempt to eradicate illiteracy by compulsory school training. The great social and educational importance of being able to read and the complexity of the mechanics of reading as a mental process have greatly stimulated scientific research in the field. The fact that an enormous number of children fail to learn to read fluently has furnished educators and psychologists with another strong impetus to investigate the reading function and the mental qualities associated with success and failure in learning to read.

The literature on reading and on the closely allied functions of spelling and writing has attained to gigantic proportions in the past three decades. This review is concerned with the most important studies of that aspect of the psychology of reading which is known as "special reading disability." The bulk of such studies may be roughly divided into three sub-groups according to the approach employed. The educational psychologist envisages his problems mainly from the point of view of evolving a general system of educational methodology; the clinician's interests chiefly center about maintaining or improving the mental condition of his patient; the laboratory expert, pursuing his art for art's sake, attempts to enrich his knowledge of the mental process as such. The psycho-educational mass experiment, the experimental laboratory, and the psychological clinic, all have made contributions of value to the psychology of reading disabilities. The persistent recurrence of certain phenomena is clearly observable in the accounts of all types of studies. This should explain the inclusion in this review of studies which were not intended to throw light on the problem of reading difficulties, and which, nevertheless, may be said to contribute more to our understanding of such difficulties than many researches which were undertaken with the express purpose of explaining them. It is impossible to subject, in the brief space allotted to this review, to a thorough-going discussion

all the valuable ideas found in the literature on reading. Only a rough correlation and classification of the most important facts and theories will be attempted. The well-annotated and comprehensive bibliography by Gray (52), representing the educational group, contains 436 English titles of which less than a dozen are repeated here. Illing (65) gives an excellent review of studies of so-called congenital word-blindness made chiefly by medical clinicians in ophthalmology, neurology and psychiatry. Hoffmann (62) summarizes the most important findings of the experimental laboratory. The just-mentioned studies should be consulted for a fuller appreciation of the accomplishments of the three groups than can be obtained from the present survey of interferences in reading. The subject will be dealt with under three general headings: A. Symptoms, B. Etiological Explanations, C. Remedial Treatment. It goes without saying that the general organization of the reviewed material has been largely determined by the reviewer's personal experiences in clinical diagnosis and remedial teaching of inferior readers.

A. SYMPTOMS

1. *Reading errors.* The most directly observable symptoms of reading difficulties are reading errors. A careful analysis of errors made by inferior readers is imperative insomuch as it may reveal the mental twists underlying their occurrence and thus facilitate remedial treatment. Bachmann (4), Hollingworth (63), Marum (86), Molitor (94), Monroe (96), and Wawrik (160) classify errors according to their external form. Monroe's list of superficial errors is the most comprehensive of all. It includes faulty vowels, faulty consonants, reversals of sounds and words, omissions of sounds and letters, additions of sounds and letters, substitution of words, repetitions of words, additions of words, omissions of words and refusals to read. This convenient way of classifying errors is not necessarily the most helpful or scientific one. Weimer (161) warns that the grouping of errors according to their surface characteristics may distinctly obscure our understanding of the mental conditions in which they occur. Most investigators realize that outwardly identical errors may have different psychological sources and that the same mental condition may be responsible for different external forms of errors. Gumpertz (54), Offner (104), Ranschburg (124), Stoll (141), Orton (106, 107, 113, 115) and Weimer (161) have made attempts to group errors according to the mental conditions leading to them. Offner stresses that spelling and writing errors are never accidental.

They are due to (a) interferences of past experiences, legitimate or otherwise; (b) an associational struggle (Associationskampf) in the motor, visual and infrequently in the auditory sphere; (c) peripheral defects. Weimer distinguishes such generic categories as interferences due to past experiences, interferences due to similarity of elements, interferences due to emotional states, and perseverations. Ranschburg believes that his principle of interference due to homogeneity of elements derived more than three decades ago from tachistoscopic experiments with normal, mature and intelligent readers is a very important factor in learning to read. The errors of this summative interference consist of confusions of similar and identical elements and of transpositions of elements within a complex series. An analysis of errors made by children in transcribing a passage convinced Stoll that the Ranschburg type of error is the most frequent of all. In 1925, Orton (106) published his first account of what he later called the strephosymbolic type of error. His strephosymbolic system comprises the following symptoms: (1) Static reversals which are confusions of single letters similar or identical in configuration but differing in spatial orientation such as b-d-p-q-h-y-g; m-w-n-u; f-t-l; a-e-c-o-s-z. Such letters are confused by poor readers either singly or more especially in combination with other letters in words. Thus "dig" may become "big" or "pig," "quit" may be read "pit," "dad"—"bad," etc. (2) Kinetic reversals are confusions of the directional sequence of letters within words or of words within sentences. Thus "bread" is read for "beard," "clot" for "colt," "left" for "felt," "who" for "how," "rams" for "arms," etc. In case of so-called palindromic words the right-to-left form is usually preferred to the left-to-right form, *e.g.*, "was"—"saw," "on"—"no," "pot"—"top," "ton"—"not," etc. The combined effect of static and kinetic reversals results in many strange neologisms in reading, "rabil" for "April," "narthish" for "tarnish," "dary" for "gray," etc. The tendency to static and kinetic reversals of non-readers manifests itself also in their facility for mirror-reading and mirror-writing. (3) Omissions and additions of letters and words are regarded by Orton as by-products of the reversal tendency. Indeed, the mental mechanism operative in most omissions and in many additions is exactly the same as that responsible for the more obvious forms of reversals. The reviewer's opinion is that omissions are almost always incomplete reversals, while additions quite frequently are completed reversals. (4) Other secondary strephosymbolic errors are perseverations and substitutions.

The error pattern of strephosymbolia may be found in all studies of reading difficulties in which an analysis of errors has been attempted. Only some findings of the more recent and experimental investigations can be mentioned here. In a thorough study of inferior readers Fildes (36) found the main source of their trouble to be a slow discrimination of similar or like forms of different spatial orientation, particularly if the method of perceiving is strictly visual and concerned with easily confused material. Monroe (95), in collaboration with Orton, found statistically significant differences between normal and retarded readers in the number of kinetic reversals, repetitions, errors in recognizing the correct orientation of letters and words when presented in both normal and mirrored forms, and confusions of b-d-p-q-u-n. Facility in mirror-reading and mirror-writing, naming of pictures from right to left and the amount of time used in reading the alphabet also yielded significant differences between good and poor readers. Bachmann (4), employing a proof reading test, found that the difference between his non-reading and control groups in their tendency to overlook reversal errors was nine times as great as that for any other form of error. Orton's (107) assertion that the frequency of reversals bears a direct relation to the severity of reading disability has recently been tested by Teegarden (145) on children of the second and third school grades. Teegarden's reversal index, which is inversely proportional to the number of reversals made, correlated with achievement in reading to the extent of .54 for children with kindergarten attendance and .77 for children without such attendance. Gates and Bennett (49), despite restricting their study to reversals of the purest and perhaps rarest form—that of palindromic words, obtained pronounced differences between the reversal tendencies of their experimental and control groups. Hildreth (59), accepting the criterion of external form, observed more reversal errors in poor than in good readers. She remarks, however, that the number of reversals is small in comparison with other errors. The findings concerning the relationship between reversal errors and reading ability depend largely on the investigator's notion of reversal errors. The most concise and perhaps the most accurate summary of reading errors is that made by Burt (17) several years before Orton's first article appeared. According to him reading errors consist in (1) the "failure to discriminate between similar visible forms, especially symbols differing chiefly in order, orientation, or internal arrangement of their component parts, (2) "failure to remember a series of sounds in their due order,"

and (3) "failure to associate visible symbol and audible sound in the absence of any comprehensible connection." The most typical strephosymbolic response which the reviewer has registered during his extensive teaching experience was that of an intelligent seven-year-old girl. The phrase "a dog that likes to dig" was read by her as follows: "a god likes that pig." "God" is a kinetic reversal of the palindrome "dog"; "likes that" is a kinetic reversal of words within the phrase; "pig" is the result of a static reversal in "dig"; the connective element "to" either got lost in the strephosymbolic shuffle or may have been omitted as a result of ideo-symbolic influences. Such responses are the exception rather than the rule. Orton (107) justly points out that the tendency to assemble letters and words in an alternating sinistrad and dextrad order complicates the picture of strephosymbolic reading. Furthermore, some secondary phenomena such as habits of guessing, substituting and supplementing the context may be mistaken for true signs of reading difficulties.

2. *Word reading.* The inability of many children to read words as a whole has been stressed by practically all workers. Indeed, the concept of word-blindness is based upon this important feature of reading disability. The markedly inferior perception and memory for words has been considered the central sign of reading disability by the clinical group. Gates (47), an active educational experimenter in the field of reading, found 94 per cent of all backward readers studied to employ inappropriate techniques of perceiving word forms quickly and accurately. Word-blindness, even as a purely descriptive term, has a strong tinge of old-fashioned faculty psychology. Illing (65), in his able discussion of congenital word-blindness published in 1928, clearly posits the existence of separate abilities or faculties to read letters, words, sentences, numbers and musical notes. Abnormalities in these faculties are independent clinical entities. These naively simple notions of letter-, number-, note-, and word-blindness persist in spite of the functionalization of the psychology of aphasia by such authorities as Marie, Pick, Niessl-Mayendorf, Monakow, Lashley, Head and others. To the modern psychologist letter-, number-, and word-blindness are one and the same phenomenon.

3. *Spelling and writing.* Numerous workers noticed that difficulties in reading are associated with difficulties in spelling, whether oral or written. Ranschburg (124) found legasthenia or reading disability always associated with paragraphia, a deficiency in written spelling. Experimental evidence exists to show that of the various

types of written spelling spontaneous compositions are most affected, transcriptions least. Writing to dictation yields more errors than transcriptions, but fewer errors than compositions. According to Orton (107, 115) non-readers frequently produce a chaos of neographisms in written spelling. Berkhan (7) described the same phenomenon in 1889 under the name of "hottentottism." Naville and Saussure (100) compare the fantastic "letter salad" of their patient to "jargonagraphia" found in some cases of aphasia. Orton (115), Ley (76) and others report that spelling difficulties persist after improvement in reading. The errors of spelling closely resemble those of strephosymbolic reading. In a recent study of special disabilities in writing Orton and Gillingham (116) stress the diagnostic value of this skill for reading. They discuss the inconsistencies in slant, distancing and leveling of the handwriting of strephosymbolic readers.

4. *Reading of numbers and achievement in arithmetic.* Figures are confused by beginning non-readers just as much as letters. In fact, reversal tendencies may be better demonstrated on numbers than on words (36, 124). On the other hand, educational profiles of non-readers clearly indicate their comparatively much better achievement in arithmetic than in reading connected prose. Several reasons have been advanced for the observed differences between the ease with which poor readers learn to read figures and words. Chance (19) attributes it to the fact that figures have complete mental values whereas letters and words require context to impress their meaning. Brissaud (14) points out that the reading and writing of figures is ideographic while that of words is phonetic. There are only 10 symbols for figures but 52 symbols for letters, a fact stressed by Orton (107), Illing (65), and Dearborn-Carmichael-Lord (81). Dearborn thinks that the fixation of figures in reading is more analytic and consecutive than that of words. Illing (65) justly emphasizes the considerably greater auditory value of the names of figures in comparison with that of single letter sounds. Compare, for example, the "scr" in "scroll" with "three hundred ninety seven" in 397. The reviewer would like to add several other factors not mentioned in the literature. Figures have only names; letters have names and sounds. Many letter symbols have several sound values. Furthermore, apparently uniform sound values of a letter are in reality never the same due to changes in accent, pitch, timbre, assimilations and other intraverbal interferences. In view of the immense complexity and the distinctly functional, unstandardizable nature of

sound values of letters the reading of numbers seems like a relatively simple task. But this is not all. Good mastery of reading figures is also facilitated by the ordinary methods of instruction. The beginner is never asked to perform arithmetical operations with three, four or five place numbers from the start. Instruction begins with one place numbers and very gradually advances to two place numbers, etc., the child being carefully taught at each successive stage the meaning and manner of reading each figure in the various positions. This is not the case even in extreme synthetic procedures of learning to read connected prose.

5. *Time of reading.* The lack of fluency in reading and undue slowness are declared to be definite signs of reading difficulties by almost all investigators. Monroe (95, 96) found the differences in reading time between defective readers and their normal controls statistically significant. Bachmann (4) considers long reaction times an important characteristic of inferior readers. Claparède's (22) diagnostic term "bradylexia" is based upon the temporal aspect of the performance of a backward reader. His patient read only thirty words per minute instead of the normal 120 words for his age. Kirste (71) attributes slowness in reading to a natural synthesis in learning.

6. *Appeal to auditory memory.* Hinshelwood (61) was the first to describe the tendency on the part of word-blind children to make use of their auditory capacities. Some of his patients would spell out each word before they read it. Others would try to conceal their defect by learning the assigned lessons by heart from listening to others either in school or at home. The tendency to oral spelling during reading was also observed by Jackson (66), Bruner (16), Molitor (94), Orton (107), Meumann (92), Heitmuller (58), Chance (19), Variot (152), Witmer (169), and others. Lind (58) reports that teachers of word-blind children usually consider them the best of the class in oral tasks. Thomas (146) knew a surgeon who acquired his professional knowledge by ear at "grinds" and lectures. Drenkhahn (31), himself a physician, owed his advancement in school to the then prevailing methods of oral examinations. Doyne (39), Drenkhahn (31) and others remembered classmates who learned their lessons almost exclusively via the ears because of reading difficulties. Warburg's (159) children knew entire books by heart. The present writer found ample confirmation of this in his practice. One very intelligent boy, an extremely poor reader, had memorized about half a dozen of his textbooks. He was

always anxious to read from them, and, whenever, the page was indicated, he "read" quite correctly without opening the book.

7. *Eye movements and attention span.* Dearborn (29) discovered in non-readers a distinct tendency to tackle words from the wrong end. Opitz (105) wrote in 1913 that word-blind children belong to the fixating type and that their eyes could be seen wandering back and forth along the line, at times over the entire paragraph. Hincks (60) reports that the eye movements and fixations of all her subjects were irregular and uncertain. Their perception span was small which, she suspects, may be the result of limited peripheral vision. Ranschburg (124) observed a narrowing of attention span for series containing similar and identical elements. Indirect vision is considered by Meumann (92) important for getting the correct line in the back sweep. Molitor (94), Wawrik (160) and the reviewer found the tendency to skip lines or repeat the same line to be very persistent and common in inferior readers. Meumann also stresses the possibility of introducing elements occurring several lines above or below the actual place of reading when eye movements are irregular. In the reviewer's experience this is not uncommon. Orton (115) minimizes the importance of eye movements in reading disabilities.

8. *Handedness and eye preference.* The great facility of backward readers in mirror-writing has caused some workers to link it up with left-handedness. According to Erlenmeyer's (11, 26) hypothesis of antitropism of hand movements mirror-writing for the left hand is the natural homologue of the conventional dextrad writing for the right hand. Hanse (55) believes that left-handedness, mirror-writing and reading defects are different signs of the same intrinsic condition. Hincks (60) found in many non-readers, if not definite left-handedness, distinct traits of "left-mindedness." Anderson and Kelley (2) found 19 of 71 cases studied to be left-handed. Monroe's (96) defect cases reported more numerous changes from left to right hand in writing and a larger incidence of left-handedness among members of the immediate family than her control cases. Left-handed children made no more reversals, proportionately, than right-handed children according to Hildreth (59). One-third of Dearborn's cases were left-handed. Gates and Bennett (49) conclude on the basis of experimental findings that left-handed children, in general, show no greater difficulties in reading than right-handed children, that the percentage of left-handed children among those making many reversal errors is no greater than

in the population at large, and that among those subject to serious difficulties in reading the percentage is similar to that found among representative readers. Writing, throwing and reaching served as tests of handedness. Critchley (25) thinks that mirror-writing is the result of a reading defect. It is due to the uncontrolled activity of natural kinesthetic memories which are allowed to produce without the corrective supervision of visual imagery. Bethe (10) regards the connection between handedness and hemispherical dominance in speech, reading, etc., as a very loose one. Orton (116), in his more recent studies, considers hand dominance and eye preference points of secondary interest. His findings show that non-readers with right-eye dominance and right-handedness outnumber those with other patterns of eye and hand dominance. Similar results on eye dominance and handedness were obtained by Monroe (96). The latter believes that left-eye preference may be associated with mirror-writing, and this with reading disability. Left-eye dominance is considered by Gates and Bennett (49) a real source of difficulty in reading insomuch as 10 per cent of left-eyed children are likely to develop reversal tendencies. It is obvious that the differences in opinion and results on the relationship between handedness and reading difficulties are largely a matter of experimental technique rather than facts. The statistics of the incidence of left-handedness vary from one-tenth of one per cent to 41 per cent of the general population depending upon the age, intelligence, emotional condition, and level of civilization of the groups studied. The statistics of the incidence of reading disabilities are almost as variable as those of handedness. Bethe's (10) experiment on the handedness of small children deserves being mentioned. Having found many left-handers among very young children he concludes that the prevalence of right-handedness among adults is largely an acquired habit. Both his findings and his view warrant the inference that about 50 per cent of all people are more or less right-handed by birth and the other 50 per cent are more or less left-handed by birth. The large majority of people are neither too right-handed nor too left-handed to be trained to become either.

9. *Sundry symptoms.* Ranschburg (124), Orton (107), Wawrik (160), Plate (121) and others found a pronounced lack of meaningful intonation and improper accents in the reading of backward children. Opitz (105) remarks that the occurrence of errors is independent of voluntary action. Children are not aware of their errors. Orton (106) found that children are frequently unable to

correct themselves even when errors are pointed out to them. Hollingworth (63) believes that spelling errors differ in degree, not in kind, in extreme and mild cases. Kirste (71) holds the view that inferior readers differ from good readers not only quantitatively but also qualitatively. They are different types of readers. They never reach the stage of thoroughly and permanently mechanized reading. Experimental findings on reading tend to confirm Kirste's point of view. All typological classifications present a clear-cut dichotomy. Messmer (92) distinguishes between the objective (strophosymbolic?) and the subjective reader. The former's attention is fixed upon the stimulus, the latter's is turned inward. Meumann's (92) first type is slow, hesitant and fixating (strophosymbolic?); his second type is fast, fluent and fluctuating. The former fixates long words first at the right and gradually proceeds backward, the latter fixates first the beginning of the word, then the end and finally the middle. Dearborn, studying eye movements, found rhythmic and arhythmic (strophosymbolic?) readers. Rieger (129) speaks of legato and staccato (strophosymbolic?) readers. Vernon (155) reports two types of eye movements in mature readers, one showing a large number of short fixations with numerous regressions (strophosymbolic?) the other showing a small number of long fixations with few regressions. Vernon and Meumann also emphasize that the predilection for, and the occurrence of, certain inappropriate techniques persist despite prolonged and systematic educational influences as they may be found in intelligent, highly educated and accomplished readers. Thorner (149) distinguishes a fast, visual type and a slow, auditory-motor type of reader (strophosymbolic?). Oeser's (103) integrated type is characterized by good mobility of words, good use of associative determinants in the fixation of large complexes, tendency toward coherence between internal and external stimuli, and a passive or sub-cortical "Einstellung." His disintegrated (strophosymbolic?) type is marked by objective faithfulness in fixation, active perseveration, a uniform affective state with respect to what is read, and a tenseness of conscious or cortical attention.

10. *Examination methods.* The use of standard tests renders the discovery of a defective reader a relatively simple task. A complete diagnostic examination involves not only the child's standing in reading in relation to the average level of children of his age, grade or intelligence, but also the relative position of the level of achievement in reading as compared with that in spelling, arithmetic, intelligence, etc., in the same child. Décroly (30), Monroe (96),

Orton (107) Phillips (120), and Weimert (162) consider the differential psychogram or educational profile of as great diagnostic and prognostic value as the determination of the severity of the reading disability. Monroe (96) has a set of valuable diagnostic reading tests based upon a good understanding of the psychology of reading difficulties. Monroe (96) and Kirsche (71) employ reading indices for purposes of convenient evaluation of a child's achievement in reading in comparison with that of other functions or other children.

Ranschburg (124) used both continuous and discontinuous examining methods. The continuous method studies the child in a more or less natural reading situation. Reading time, number of errors and eye movements may be recorded. The discontinuous or tachistoscopic examination is used to study reaction times, errors and eye movements. Although for practical purposes the continuous method of testing is adequate, the tachistoscopic test is much more differential in the segregation of the truly good reader from the inefficient reader. In control experiments intending to establish or refute the validity of a scientific hypothesis the use of a tachistoscope is imperative.

The reviewer considers no diagnostic examination complete without tests in spelling and handwriting. Unfortunately little is known about the latter and its diagnostic value in reading difficulties.

11. *Frequency of reading disabilities.* The statistics of the incidence of reading difficulties in school children are subject to wide fluctuations, because they depend upon arbitrary definitions of the severity and nature of the dysfunction. Ranschburg (124) found 15 per cent of all second grade pupils examined definitely legasthenic. Among mentally defective children (morons?) the proportion of chronically word-blind cases amounts to 25 per cent. Monroe (96) estimates that about 12 per cent of the total population have reading defects. Razkaja (125) found 12 per cent of eleven to thirteen year old children badly retarded in reading and other subjects. Wallin's (158) figures show that 4.5 per cent of 2,116 school cases examined suffered from congenital word-blindness, "an incidence greater than the combined incidence of epileptics, psychopaths, mongols and cretins." Schiller (134) accepting incurability as a criterion of word-blindness found not one typical case among 45,000 Stuttgart children. Tamm (144) attributed scholastic backwardness of 11 per cent of 500 retarded Stockholm children to congenital word-blindness. Illing (65), Warburg (159) and Brunn (134) made school surveys and found the number of cases of word-blindness to vary between 2 to 7 per thousand. Orton (107) estimates that

the reading abilities of 2 to 4 per cent of the general population are low enough to be a great obstacle in school progress.

B. ETIOLOGICAL EXPLANATIONS

1. *Locus of difficulty.* (a) Visual acuity and refractory errors. The common tendency to look for the source of reading difficulties in the peripheral visual apparatus has been subjected to a good many tests. Monroe (96) compared large groups of non-readers with normal readers and found similar proportions of visual defects and refractory errors in both groups. White's (165) control experiment confirms Monroe's results. Orton's (115) findings enable him to conclude that visual defects are an insignificant factor in reading disability. Kaz (67, 68) noticed that many school children, particularly girls, were referred to him for eye examinations because of reading difficulties. Most of them needed no glasses. He speculates that congenital dyslexia may cause myopia at an age when this rarely occurs. Fisher (38, 39) an ophthalmologist, points out that reading difficulties are unjustly attributed to minor errors of refraction. The majority of clinical workers report the eyes of their cases healthy and their vision intact. Such well-known ophthalmologists as Hinshelwood (61), Stephenson (139), Bruner (16), and Claiborne (20, 21) hold the view that visual defects, if they do occur in inferior readers, are purely coincidental and of little significance as causative factors. The inclusion of visual defects among the causes of reading difficulties by Monroe (96) must be interpreted as an attempt to list more or less remote possibilities rather than to discover the truly significant cause. Gates and Bennett (49) found twice as many children with glasses in the reversal as in the non-reversal group. They conclude that "visual defect of some sort is the most conspicuous characteristic of the reversal group thus far found."

(b) Auditory acuity. White and Poull (165) found non-readers to be better than their controls in auditory acuity. In Bachmann's (4) cases audition was perfect. There is in the literature no instance in which reading defect was ascribed to inferior auditory acuity.

(c) Visual perception. Orton (107) believes the perceptive visual level to be intact in children with reading difficulties. White and Poull (165) failed to find any significant differences between non-readers and control readers in visual perceptions. Wallin's (158) comparison of word-blind children with normal control cases showed the former to be superior in "concrete visual memory." Marum (86),

Molitor (94), and Wawrik (160) found visual perceptions of their non-readers either intact or superior to those of control readers.

(d) Auditory perception. The control experiments of Wallin (158), White and Poull (165), Wawrik (160) by means of tests of auditory perception and memory span gave no evidence of inferior auditory capacities of non-readers.

(e) Sound discrimination. Inferior discrimination of sounds was found by Ritter (131) in 1902. Claiborne's (21) patient was unable to make the word "fox" by putting the sound "f" in front of the word "ox" which was known to her. Marum (86), Molitor (94), Rutherford (133) found similar difficulties in the children studied. Monroe (96) tested the ability of children to fuse given sounds into words. The differences between readers and non-readers in this function were statistically significant in favor of the readers. Monroe, like Claiborne, Ritter, Rutherford, Marum, and Molitor, attributes it to inferior auditory capacity of non-readers and lists poor discrimination of sounds and sound sequences among the causative factors of reading disability. Orton (115) is inclined to look upon the inability of these children to synthesize sounds into words as the result of the lack of control by "visual implants." A spontaneous analysis of words into their constituent sounds is unlikely to occur in poor readers unless it is suggested by graphic symbols visually perceived. Mispronunciations and failures to blend sounds into words may thus well be an effect rather than a cause of reading disability.

(f) Motor control. Marum (86), Molitor (94), and Wawrik (160) compared non-readers and controls on various tests of motor control and found the former to be invariably inferior. These investigators thus incline to the view that the trouble has a motor basis.

2. *Theories of causality.* Conjecture and coincidents loom very large in many etiological explanations of reading difficulties. There is perhaps no physical disease and no mental condition that has not been blamed at one time or another for difficulties in reading just because it was associated with such difficulties. Mass experiments, statistical calculations and objective tests have not saved investigators from misinterpretations.

(a) Hinshelwood (61) was the first to attempt an explanation of the disturbance called by Morgan (97) congenital word-blindness in 1896. Reading disability, according to him, was caused by the destruction or maldevelopment of the visual memory center for words located in the gyrus angularis and the gyrus supramarginalis of the left cerebral hemisphere. The existence of separate centers for

words, letters, figures and notes was assumed. Doyne (90), Fisher (38), Jackson (66), and Chance (19) accepted Hinshelwood's hypothesis of brain destruction in its original form. McCready (89, 91) explains the more frequent incidence of word-blindness among boys than among girls by the larger size of the head of the male child at birth which makes it more liable to injury during labor.

(b) Ranschburg (124) may be regarded as the chief representative of the theory of physiological incapacitation of the visual centers for words. According to his view reading disability is caused partly by an inherited vaso-motor hypoplasia of the capillaries supplying the word center. He believes the structure of the brain to be intact, but the word center is undersupplied with blood and therefore with oxygen. He is unable to give a neural explanation of his interference factor due to homogeneity of elements, although he mentions the possible effect of hemispherical dominance. Wawrik (160) assumes a weakening of the excitability of nervous tissue and its reduced functional plasticity. Since reading difficulties were found more frequently in the youngest child than in the first-born and only child Warburg (159) attributes it to a physiological exhaustion of the nervous system. Ley (76) presents two possibilities, either a psychogenic retardation of the association centers or a retarded myelinization of the connecting fibers between the visual and auditory centers. Pritchard (123) assumes a defect at the synapses linking neurones of closely associated nerve centers.

(c) Most criticisms of the two preceding theories were directed against the concept of pre-formed centers. Marie and Déjérine protested in 1904 that congenital word-blindness had nothing in common with acquired aphasia and that it was not a disease. Engler (33), Wolff (170), Reichardt (126), Makuen (84), and MacLeod (83) rejected the destruction hypothesis as unproven and unfounded. As the disease began to assume the proportions of an epidemic Makuen (84) began to regard the destruction of the same circumscribed area in exactly the same portion of the brain in so many individuals as improbable. In the wake of these criticisms new hypotheses sprang up. Wolff (170) and Engler (33), who believed that other parts of the brain would take over the function of the affected region, became the chief exponents of the hypothesis of general mental deficiency. Foerster (41), Ritter (131), Rieger (129), Stier (140), A. Peters (118), Girstenberg (51), and Schiller (134) sponsor the view that congenital word-blindness is a part symptom of defective intelligence or psychopathic constitution. Wolff (170) chides

the psychologically untrained ophthalmologists for misjudging their patients' intelligence by the use of inadequate criteria of comparison. Weimert (162) later offered an explanation of this misunderstanding. He suspects that non-readers with inferior mentality or psychopathic involvement were usually taken to psychiatrists, while intelligent and stable children were usually referred to eye specialists. Voss (157), Kraepelin (65), and Völsch (156) mention schizophrenia as a possible cause of the trouble.

(d) Witmer, using the analogy of general intelligence, pronounced himself in favor of the theory of biological variation as an explanation of reading disabilities (168). Reading ability as a unitary trait varies so as to fit the probability curve. Poor readers simply represent the fag end of the distribution. This view of "special reading disability" is also held by Hollingworth (63), Bronner (15), and Kerr (69). Rutherford (133) considers congenital dyslexia a phenomenon of atavism, a reversion to the pre-civilized type due to loss of the more specialized determinants in the "gametic idiosyncrasy." Noell's (102) view is similar to Rutherford's.

(e) Gates (47, 49) propounds the view of acquired techniques as against the theories of brain organization or of biological variation. A multitude of factors governed by the law of chance determine the abilities in reading and spelling. Defective vision, defective hearing, eye-muscle control, lack of training, inappropriate training, home training, poor writing, motor incoordination, specialization and perfection of neural organization, emotionality, nervous instability, inertia, and poor health may cause reading difficulties. There is no evidence, not even in Gates' own studies, of the chance operation of many of these so-called causal factors. Besides, mere correlation is not causation.

(f) Orton (107-116) ascribes reading disabilities to differences in the functional organization of the central visual components of the two cerebral hemispheres. He postulates the existence of three levels of cortical elaboration. The perceptive level controls our awareness of external stimulation; the recognitive level controls the recognition of objects; the highest or associative level controls the intellectual functions of speech, reading, writing, etc. The oneness of mental impressions at the two lower levels is achieved by fusion of messages, at the highest level by hemispheric dominance. The physiological habit of dominance is predetermined by heredity. In the large majority of people it establishes itself in the left hemisphere. The selective use of the right hemisphere is a recessive, sex-linked trait.

Both sides of the brain are irradiated, but the engrams of one side are mirror images of those of the other side. Under normal circumstances only the engrams of one side operate in reading. Their mirrored mates remain inoperative. Interferences in reading are explained by the failure to establish the physiologic habit of complete elision of engrams of the non-dominant hemisphere. Noell (102), Hincks (60), and Fildes (36) find no experimental evidence of separate unrelated abilities to perceive objects, geometric forms and symbols such as are implied in Orton's theory. The perception of words is simply a more complex function than that of objects; it requires a greater degree of quantitative neural differentiation (102). Bachmann (4), Illing (65), Ranschburg (124), and Gates (49) regard Orton's neural explanation as bold, unfounded, unnecessary, and old-fashioned. Vernon (155) calls Orton's theory ingenious and finds the experimental evidence unquestionable. Despite the wealth of sound psychology contained in Orton's writings, his neural theory appears deduced outside, rather than induced from, the facts. His vertical neuro-facultism is a return to the Gall-Broca-Charcot localizations of functions.

(g) There are in the literature several broad hints at a psychological theory of motor left-sidedness. Dearborn (29, 81) and Hincks (60) have expressed it perhaps more clearly than anybody else. They explain it on the basis of strong sinistrad tendencies of the motor mechanism conflicting with the dextrad mode of conventional reading and writing. Frank (44), Fildes (36, 37), and Reichardt (126) seem to incline toward a similar view. The latter believes that differences in temporal and kinetic qualities of neural impulses determine success or failure in reading. According to this motor hypothesis the levosymbolic reader is not a defective but a different reader. In fact, the reviewer believes that, all other things being equal, his potential reading abilities are directly proportional to his failure in dextrad reading. Reversals, omissions, mirror-writing, and mirror-reading are conditioned by an innate levotropism of the motor apparatus of the entire body. Reading ability is a matter of the differential dynamics of the functional asymmetry of a bilateral motor mechanism. The strephotropism of the body varies according to the law of normal variability. Levotropism is neither recessive nor sex-linked. Reading difficulties have both a qualitative and a quantitative basis. Reading disability is essentially a social disease. Sidedness should not be confused with handedness, although refined

measuring techniques may show the two variables to be closely associated.

(e) The hereditary nature of reading disabilities has been pointed out by practically all investigators. Its familial incidence has been observed by Thomas (146), Bluhm (13), Fisher (38), Critchley (25), Clemesha (24), Hinshelwood (61), Hincks (60), Clark (23), McLeod (83), Orton (106, 107), Plate (121), Stephenson (139), Warburg (159), and Wawrik (160).

3. *Co-determining factors.* (a) Intelligence. By co-determinants we mean those intrinsic personality variables and extraneous forces which by virtue of their inevitable presence always influence the incidence, symptomatology and treatment of any mental dysfunction. The most important co-determinant is the general intelligence of the child. That reading difficulties occur independently of intelligence is well shown in all control experiments so far undertaken. The overwhelming majority of clinical cases reported are of average intelligence. If the observed proportion of non-readers increases with decrease in intelligence, as it seems to (36, 59, 96, 107, 124), it does so because the intellectually inferior child is, on the whole, less successful in his struggle against those tendencies which do constitute the primary cause of failure in reading.

(b) Emotional imbalance. The rôle which emotional instability plays in learning to read is practically unknown. At least the reviewer has found not a single attempt to investigate its effect upon achievement in reading, spelling and writing. Pritchard (123) considers the intermittence of errors a sign of neurasthenia. Wernicke (163) found a neuropathic disposition in one of three cases studied. Illing (65) observed psychopathic tendencies in five out of twelve cases. Hincks (60) thinks that reading difficulties tend to occur in neuropathic stock. Although it is sensible to assume that emotional difficulties constitute a deterrent factor in overcoming the true obstacles in reading disability, there is hardly any evidence to support the view that neuropathic disposition, psychopathic tendencies and emotional instability are primary causes of reading disability.

Accounts of the effect of reading difficulties upon the emotional life of the child are in good agreement with one another. Orton (107) gives the most comprehensive summary of unwholesome emotional attitudes in non-readers. They evidence a strong apathy for reading, spelling and subjects in which reading is an essential tool; they block emotionally and shown signs of inferiority feelings and exhibit

paranoid and antagonistic tendencies toward parents, teachers and classmates. Conduct problems may increase from year to year as the children are continued to be misunderstood by their social environment. That these attitudes are not permanent infirmities may in many cases be shown by remedial instruction. Improvements in general attitude are usually marked and oftentimes quite radical.

(c) Temperamental factors. W. Peters (119) discusses the effect of this co-determinant upon errors and treatment. According to his analysis the naturally timid child tends to make chiefly two kinds of errors, reversals and omissions. He shows an exaggerated sense of inferiority, but being conformant and a visual type, he is quite educable. The extrovert is quick and superficial. He makes many sudden stops, skips lines, loses his place on the page and is generally disorderly. In addition to reversals and omissions he makes many other errors. He adds words, guesses, substitutes and supplements the context. Although he complies for a time, he is less educable than the introvert.

(d) Educational opportunity. The most important environmental co-determinant of failures in reading is lack of training. Warburg's (159) school survey of 1910 showed that practically all word-blind children came from districts inhabited by people of low economic and cultural status. Schroeck (136) emphasizes that prolonged training modifies the error pattern of inferior readers both qualitatively and quantitatively. That word-blind children of intelligent and wealthy parents are early detected and receive proper treatment was known to Nettleship (101) in 1901. Orton (107, 112) and Naville and Saussure (100) believe that the sight method of teaching to read aggravates reading difficulties. A. Peters (118), Chance (19) and others stress the importance of proper motivation and of constructive assistance by others. Those clinicians accustomed to think in terms of letter, figure and word-blindness failed to recognize the obvious developmental fact that a beginner was usually both letter- and word-blind, but that the child with several years of school training was only word-blind.

(e) Sex differences. Practically all clinical studies of reading failures show a prevalence of boys over girls. Monroe (96) concludes that there is something about a boy which makes him nine times as likely to fail in reading as a girl. Thomas (148) found about three times as many boys as girls among severe reading failures, but believes that the condition is just as frequent in girls as in boys. Hildreth (59) did not find any greater tendency toward reversals in

boys than in girls. Gates and Bennett (49) point out that there is a marked difference between the number of boys among reading-defect cases referred for clinical study and the number found in school surveys. The reviewer working under circumstances in which the chances for being referred to the clinic are about equal for boys and girls failed to find evidence that boys are more frequently subject to reading difficulties than are girls. Experience in remedial work, however, shows that girls are, on the whole, easier to motivate, are more industrious and overcome the handicap in a comparatively shorter time. Gates (49) also believes that parents tend to seek expert assistance more frequently for boys than for girls because of a greater interest in the vocational future of boys.

C. REMEDIAL TREATMENT

1. **Prognosis.** Considerable optimism reigns among all schools of thought concerning the outcome in treatment of reading difficulties. The majority of investigators predict rapid improvement by corrective instruction. Improvement depends just as much on a favorable constellation of co-determinants as it does on the severity of the difficulty itself.

2. **Individual instruction.** The most important factor in the treatment of reading disabilities is individual teaching. The poor reader belongs neither in the normal class, nor in the special class, nor in the ungraded class, nor in the private school, but should have individual assistance, writes Ranschburg (124). Individual instruction is advised by practically all writers.

3. **Children's attitudes.** To establish a healthy attitude in the child Hinshelwood (61) advises to avoid harsh treatment and punishment for something for which the child is in no wise responsible. Jackson (66) and Orton (107) would not discourage the child by ridiculing or emphasizing his frequent failures. They would foster the feeling that improvement is possible by pointing out his successes. Gray (53) advises to gain the complete confidence and coöperation of the pupil, to stimulate his interest, excite his curiosity and hold his attention. Illing (65), Gates (47) and others would try to make the lessons as interesting as possible by varying the reading material and by the use of various supplementary and intrinsic devices such as pictures, flash-cards, concrete objects, carrying out orders and instructions, etc.

4. **Background of teacher.** Hinshelwood (61) and Ranschburg (124) would entrust remedial treatment to specially trained

teachers. These would have to have a thorough knowledge and understanding of the psychology of reading disabilities and of the human personality in general. Many suggest that the teacher be extremely patient, sympathetic, tactful and resourceful.

5. Methods of teaching. Although Gates (46) and several other writers realize that individual help, time and patience are the chief essentials in remedial training, most discussions of treatment are almost entirely devoted to specific methodological procedures. Meumann's classical *Vorlesungen* (92) contain the most comprehensive outline of teaching methods based upon a penetrating analysis of all phases of the teaching and learning situation. The majority of suggestions for remedial treatment made by other writers are casual, fragmentary and one-sided.

The differences in opinion as to the most effective ways of teaching reading seem to be marked and many. One source of confusion and partiality lies in the failure on the part of many workers to appreciate the fact that reading involves both mechanical skills and intellectual comprehension. Those who believe that reading should be nothing but thinking are for the "sight" system, or better, the "thought" system of teaching reading. Those who believe that learning to read is little more than the acquisition of a set of mechanical skills favor the strictly synthetic or phonetic approach. The Jacotot-Décroly system, used by Gates (47, 48) and adopted by many schools in America, begins with teaching words and brief phrases or sentences. The advocates of the phonetic approach advise to teach single sounds and letters first, then the blending of sounds into words, and finally the combining of words into sentences and sentences into paragraphs. The consensus of opinion is distinctly in favor of the phonetic approach in remedial teaching. It is clear, however, that either system used to the exclusion of the other is a partial system. Thomas (148) was perfectly right in asserting that "the education in pronunciation of the phonic system, the auditory spelling of the ordinary analytic system, and the fixing of all words learnt by the 'look-and-say' method must all have a part in the ideal system." Ranschburg (124), Meumann (92), Dearborn (81), and Kirste (71) see a distinct need for both drills in mechanics and training to read for thought. A thorough mastery of mechanics promotes effective habits of transmission of ideas; utilization of meaningful material aids in the acquisition of proper reading skills. Orton (107), Ford (43) and others hold training in phonics essential because it provides the child with a method of attack in the presence of new

words. It enables the child to help himself. The thought method encourages guessing, confusion of patterns of similar configurations, and a great deal of memory work.

Within the sphere of mechanics visual, auditory and kinesthetic impressions coöperate in the acquisition of reading skills. Many workers fail to recognize the fact that the coördinate functioning of all three types of impressions leads to most effective reading habits. Some students have the peculiar therapeutic philosophy that only the unaffected channels should be trained, while the weakened component is to be ignored. Variot (153) and Bruner (16) are for the exclusive appeal to the auditory functions because non-readers naturally tend to learn by ear. Orton (107, 116) feels that methods of reëducation must be based upon training for simultaneous association of visual, auditory and kinesthetic fields. Elsewhere (111) he deplores the tendency to teach chiefly by ear. In accordance with his visual theory he proposes to increase the facility of the visual pathway in order to give the child a "better rounded capacity for implantation." Wawrik (160) would study the imagery type of the child and train the weakest component to make the interrelation to all functions more harmonious. In his more recent studies, Orton (115,116) stresses the importance of the kinesthetic factor for treatment. Pointing, tracing and handwriting help to maintain consistent direction and encourage the selective unilateral use of one hemisphere. Gates (49) and Fildes-Myers (37) believe kinesthetic leads to be very important, as for efficiency in reading the formation of a definite habit of dextrad progression is imperative. These investigators stress the fact that the child's early experiences are little concerned with the relative arrangement or placement of objects in space or with the direction from which such objects happen to be viewed. Fernald-Keller (35), Richards (127), Muchow (99) and many others favor the use of the well known Seguin-Montessori method which lays considerable emphasis on the development of the kinesthetic component by simultaneous exercises in tracing, pointing, touching and handwriting. The reviewer knows no better exercise for the formation of the habit of dextrad sequence in reading than handwriting. Writing slows down the already laborious process of learning to read, but experience in remedial tutoring tends to indicate that, as Thomas (148) puts it, "the longer way round is the nearer way home."

Certain methodological procedures constitute a distinct violation of the principles of developmental psychology. The learning of young

children cannot be measured by adult standards. Dearborn, Meumann (92) and others found that children tend to fixate single letters rather than words. The reading of words by a beginner is accomplished by a large number of isolated, voluntary acts. His attention span is small, he makes many pauses. Meumann (92) compares initial reading with learning to typewrite or play piano. In complex motor acts, he points out, totality responses are established only by slow and progressive automatization of the fusion of many isolated reactions. Meumann (92), Hoffmann (62), and Kirste (71) regard the phonetic approach as the more natural one from the developmental standpoint.

Another factor to be considered in teaching reading is the nature of the external stimulus. Ranschburg (124), Kirste (71), Geissler (50), Stoll (141), and Egenberger (32) found that similarity of elements makes reading, spelling and writing more difficult than heterogeneous series. Geissler contends that the human mind naturally tends toward contrasts, opposites and differences. Ranschburg advises to begin with dissimilar forms, as contrasts prevent confusion and are, in general, better adapted to the psychology of learning.

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BOOK REVIEWS

PETERMANN, BRUNO. *The Gestalt Theory and the Problem of Configuration.* Translated from the German by Meyer Fortes. New York: Harcourt, Brace and Co., 1932. Pp. xi+232.

The increasing number of philosophically oriented, critical monographs by German writers on the Gestalt theory of Wertheimer, Koehler, and Koffka attests the importance of this school as a movement in scientific thought. The present work covers about the same ground as those of Scheerer, Matthaei, and Brunswik. It presents the history of the Gestalt problem in general, singles out the Berlin school as that branch of Gestalt psychology which pretends to make the most radical break with the conservative theories, presents the works of these writers in some detail, and, finally, subjects their views to a methodological and epistemological critique. The mode of presentation and the nature of the criticism, however, are quite distinctly Petermann's and it is with these aspects of the work that the present review will deal.

Petermann presents separately the "conceptual constitution of the Gestalt theory developed in its genetic continuity" first, and then turns to the "concrete empirical foundations of the Gestalt theory." The attempt is thus made to separate fact from theory. Whether or not this can validly be done in the light of our present ideas on scientific methodology is certainly an open question. In the reviewer's opinion the so-called facts of any science are meaningful only in connection with the logical consistency of the theoretical system in which they are integrated. This would mean that the statement of a fact (*i.e.*, in a scientific frame) in itself implies certain theoretical postulates. However this may be, Petermann accepts as irrefutable the experiments of the Gestalt theorists as repudiating "the atomistically organized, synthesizing scheme of the psychology of sensations and reflex-arcs." The Gestalt theorists have been successful in their attack on conventional psychology, but their success remains a negative one. Petermann is completely unwilling to view as adequate the type of Gestalt theory erected by the Berlin school. There must be a Gestalt theory, but that of Koehler will not fill the bill. So much for the general plan of the book. In developing the Gestalt theory genetically and chronologically Petermann has

undoubtedly done the science a service. If it were not for the fact that there are now available numerous presentations of the theory as such, the book would fill a real need. As it is the book in this respect can certainly be called a worthy competitor.

The reviewer finds Petermann's critique of the Gestalt theory without validity. The critique hinges on the doctrine of the physical Gestalt. As is well known, Koehler in his "Physische Gestalten" tried to exhibit Gestalten in certain physical systems in order to keep the findings of his school in line with the natural science tradition and to clarify the antithesis between mechanism and vitalism. His success has been much debated. This controversy is by no means finally settled and only the names of the contestants can be given here. Petermann along with G. E. Müller, K. Bühler, and Pickler are not convinced. The reviewer believes with E. Becher, A. Meyer, and M. Schlick that Koehler's argument is essentially sound. If anything, Koehler's "Physische Gestalten" did not go far enough. Not only do certain physical systems show the properties of organized wholes as Koehler claimed, but the field concept itself, the cornerstone of modern physics, has implicit in it the idea of an organized whole. Since Petermann's critiques of the physiological and psychological Gestalten follow from his inability to accept the physical Gestalten, they too in the reviewer's mind are invalid. The critique of the physiological Gestalten is further weakened by the fact that Petermann is apparently incognizant of the developments in American neurophysiology (Coghill, Lashley, to a certain extent Child), which stand in such good general agreement with Koehler's theoretical position. The critique of the psychological Gestalten strangely carries no reference to the work of Lewin and his students.

In a final methodological evaluation Petermann finds the Gestalt psychologists to be victimized by a "constructive method" and prejudiced by adherence to a "metaphysical physicalism." He believes the theory is now looked on as frozen and is dictating that the facts found be those of a physical nature. The reviewer, who has had considerable experience in the Berlin laboratory, is entirely unable to follow Petermann here. The Gestalt theory has been, as Petermann himself attests, in a continuous flux. In ways it may be looked on (even today) more as a generalized working hypothesis than as anything else. Concerning the "physicalism" of the Gestalt theorists there is some truth, if one understands by it the demand for rigid determinism and the search for laws that brook no exceptions. This methodologically, however, only amounts to the insistence that

scientific psychology hold to the best traditions of natural science. If physicalism be so interpreted, Petermann is right.

Although the reviewer is not able to accept Petermann's critique, this does not mean that he does not recommend this work to the American psychologist. The Gestalt theory acquires constantly more scientific dignity and almost daily attempts to handle new problems. It should be studied in all its aspects and its critics should be given hearing along with its adherents. Petermann's book represents a scholarly attempt to deal critically with some of its basic problems. That he does not convince the present reviewer does not necessarily mean that he will not convince others. Clarification of the basic problems involved will certainly result more quickly from careful criticism than from ignorance and indifference. However, the reviewer can not suppress the wish that Professor Ogden had chosen in its stead M. Sheerer's "Die Lehre von der Gestalt" for inclusion in his International Library for the English reader. The books cover the same ground, only Sheerer's criticism seems to be better put together and to have a certain validity.

The book contains the usual index and bibliography. Its format is the pleasing one of the International Library of Psychology, Philosophy, and Scientific Method. The translation although without particular literary merit reads smoothly and does not hold up the reader in his understanding through clumsy constructions and pedantic phrasing. This alone gives it a fairly high rank among contemporary translations of scientific German treatises.

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MAYO, ELTON. *The Human Problems of an Industrial Civilization.*
New York: Macmillan Company, 1933. Pp. 194.

In the eight brief chapters of this book, Professor Mayo offers sketchy but richly suggestive thoughts on some of the deep-lying problems of our industrial society. The first half of the volume is devoted to empirical studies of fatigue and morale among industrial workers; the second half describes and interprets the larger picture of social change and disorganization involved in the industrial revolution.

Professor Mayo has not attempted a systematic or exhaustive analysis. He is content to indicate a promising line of investigation, a novel direction of thought, a plausible interpretation. There is little comparison of views or critical evaluation of evidence. This all means

that the book is spirited and stimulating rather than close-knit or convincing.

The central argument of the opening chapters on fatigue and monotony is that these terms designate no simple unitary effect, but are names for widely varying changes occurring in work. Physiological experiments from the Harvard Fatigue Laboratory are described by way of illustration, and for monotony and work-feelings illustrative evidence is cited from investigations of the Industrial Health Research Board and from Mayo's own study of spinners in a Philadelphia textile mill. The author constantly reminds us that we are dealing with "total situations," "mutual dependence," "multiple determination"—and that "in organic processes, cause-and-effect analysis leads, in general, to erroneous conclusions." In this and in the conception of organic balance and the "steady state" of the organism, Mayo follows the thinking of certain physiologists, notably Dr. L. J. Henderson. Similar conclusions are cited from some of the British studies in industrial psychology, particularly views expressed by Miss May Smith.

The conception of total situation and organic unity is, I should guess, acceptable to everyone. But it has given rise to two quite different sets of implications for scientific work. According to one view, the complex interrelatedness of processes reemphasizes the need for painstaking teasing out of significant variables to be controlled, measured, and correlated. The other view contends that controls are impossible; one must study wholes, and arrive at over-all interpretations applicable to the shifting totality. Professor Mayo's predilection is clearly toward the second of the alternatives. Consequently the evidence he uses and his conclusions are little calculated to satisfy the experiment-and-measure type of scientist. The inquiries may nevertheless yield usable and lasting social knowledge. They may also serve to open problems and present leads for later more precise inquiries.

The point of view developed in these first chapters is applied in some detail to the investigations carried on over a five-year period in the Western Electric Company. These studies are described more comprehensively than in hitherto available publications—both the intensive continuous research on the output and attitudes of five women workers in the "test-room" group, and also the extensive interviewing program covering thousands of workers.

These researches admirably demonstrate both the strength and

weakness of the "total situation" approach. The "experimental" study does show, for example, that under the conditions prevailing, striking and long-continued improvements in output and morale are achieved by a small group of shop workers segregated from the main body of workers, paid whatever their performance warrants, given friendly interested supervision and considerable freedom. Likewise the relative unimportance of changes like rest periods is illustrated. But the causes of what happens can only be guessed at. Professor Mayo's interpretations are probably good on the whole. But if one is genuinely in doubt about what influences were operative or how far similar results can be expected elsewhere, there is nothing in the evidence to convince him.

The large scale interviewing program at Western Electric Company grew out of the earlier experimental study, since that study had pointed to the crucial importance of employee attitudes and of supervision. From 1928 to 1930 some 21,000 employees were interviewed. The interviewers (about 30) were chiefly supervisors who were given special training (under Mayo's direction). The interviews were aimed at eliciting spontaneous expressions of whatever was on the workers' minds. The interviewer was to listen rather than talk. A wealth of interesting material was collected in this manner—part of it material of direct value in improving work adjustments. But, says Mayo, "The interviewing program showed that the major difficulty was no mere simple error of supervision, no easily alterable set of working conditions; it was something more intimately human, more remote." The "something more intimately human" is found primarily in individual mental strains and tendencies to obsessive response growing out of feelings of personal inadequacy. These feelings in turn are held to be largely due to the nature of modern work and modern industrial life.

Further inquiry and speculation concerning this last thought occupy the remainder of the book. For interpretations and suggestions the author turns to Durkheim, to Harvard anthropologists, and to Chicago sociologists—to studies of revolution, suicide, delinquency, the mental growth of children. He focuses on the evidences and causes of social disorganization and on the ways in which the disorganization reflects itself in individual maladjustments. The key explanation he finds in Durkheim's "anomie," in the breakdown of informal social controls which occurs during periods of rapid change, in the "planlessness of living which is becoming characteristic both

of individual lives and of communities." Modern industrial life as a whole, then, with its conflicts and constraint upon the individual, is responsible for the feelings of futility, the "personal disequilibrium," the irrational conduct, the dearth of "effective collaboration" in daily work.

If one grants the diagnosis, what of the remedy? Professor Mayo turns to "the problem of administration as the most urgent issue of the present." We must find means for the discovery, development, and training of an "administrative elite." "Our administrative elite has become addict of a few specialist studies and has unduly discounted the human and social aspects of industrial organization. The immediate need is to restore effective human collaboration; as a prerequisite of this, extension of the type of research I have reported is the major requirement." Leaders of sufficient understanding will recapture for us a state of social integration in which the masses will once more possess feelings of security, social solidarity, and harmonious adjustment to their work.

In all this, Professor Mayo appears to have given little thought to the conflicting economic interests in society. He dismisses Marxism with a word and passes over Russian experience by confusedly implying that their use of modern industrial methods means that they have the same industrial organization and the same problems as has capitalistic industry. The basic thesis of the book is so vitally related to questions of social objectives and the type of economic organization that it is difficult to excuse the neglect of these matters. Administrators capable of human analysis, able to substitute a "logic of understanding" for the "non-logic of a social code," may indeed be invaluable. But what of the objectives, the ideals, the interests, of these administrators? What of their sources of power, the pressure groups back of them? These questions are not even hinted at by Professor Mayo.

The chief value of the book, it seems to me, lies not in any constructive practical conclusions and only very slightly in technical contributions to method or knowledge in the field of industrial psychology. What it does do, however, is depict a range of challenging problems in the social psychology of industry. The lesson it impresses is this: To understand the industrial worker one must see him in relation to the whole social process. Toward the understanding of that relationship Professor Mayo offers rich and penetrating suggestions.

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FREUD, SIGMUND. *New Introductory Lectures on Psychoanalysis*. New York: W. W. Norton, 1933. Pp. xi+257.

LORAND, SÁNDOR, Editor. *Psychoanalysis Today: Its Scope and Function*. New York: Covici-Friede, 1933. Pp. xv+370.

JUNG, C. G. *Modern Man in Search of a Soul*. New York: Harcourt, Brace & Co., 1933. Pp. ix+282.

Freud has summarized in the present book the additions to and revisions of psychoanalytic theory which have been made since the publication of his *General Introduction to Psychoanalysis* fifteen years ago. To indicate the strict continuity of the two books the new Lectures have been numbered consecutively with the old.

Most of the new material is Freud's own, the most interesting of which is, perhaps, that subsumed under the chapter heading "Anatomy of the Mental Personality." The concepts of id, ego and super-ego are presented clearly and in detail though without, possibly, such a wealth of analogical description as characterized earlier psychoanalytic writing. The significance of these concepts is difficult to estimate. They are internally consistent and without doubt represent an important step toward the completion of Freud's systematic structure. The id may be broadly interpreted as the organic drives plus the channels or conditions of their gratification. The super-ego represents the group of very rigid ideals and attitudes having an infantile and latency origin (conscience) plus the dynamic power which they possess in the control of behavior. The ego, the most interesting of the three divisions, may be described as the highly organized buffer between the id, super-ego, and society (reality). It is partly conscious and partly unconscious. It is the mobile, clever part of the mind through which are reached satisfactory compromises between the conflicting demands of the other forces. Like the super-ego it is composed of attitudes and ideals, but these are presumably of less rigidity and more in accord with reality.

In dealing with psychological (as opposed to psycho-neurological) problems of emotion, some such systematic terminology seems useful. It is quite evident that no reference to "mind and body," "set" or "thalamo-sympathetic processes" has as yet succeeded in adding materially to our understanding of human motivation and its expression in socio-emotional and intellectual behavior. Whether Freud's "anatomical" analysis will prove adequate can be tested only by usage since it is not open to direct methods of investigation. If experimental analysis demonstrates a greater complexity of the

processes included under these rubrics than the latter can conveniently cover, as seems not improbable, they will inevitably be discarded. In spite of the current proliferations of the character-testing school such experimental analyses do not yet exist.

From simple inspection the three divisions appear rather too arbitrary. The demarcation between attitudes developed during the latency period and those developed during adolescence and adulthood is difficult to discern in actual practice. There may well be a bimodal distribution of ideals in terms of rigidity, or unmodifiability, and unconsciousness, as the ego-super-ego differentiation demands, but it remains to be demonstrated. The difference in functions posited for the ego and super-ego leads to confusion also. Repression is a function of the latter but the elimination of conflicts by means of projection, displacement, reaction-formation and the other dynamic processes is an ego function. Again, the ego seems to be in closer touch with reality than is the super-ego; it *represents* reality. But this must be an arbitrary differentiation because it would appear that the super-ego is also a record of reality—reality as perceived by the young child in its formative years. The understanding or attitudes of the child, as they persist in the form of the super-ego, are unreal only in comparison with adult attitudes (ego). Since both groups represent a reality the distinction seems to be unwarranted if left in terms of reality only. So far as rigidity and unconsciousness of attitudes or habits are concerned, these two "parts of the mind" may represent simply the extremes of a distribution; in such case we would be dealing with the familiar error of extremes as types. Many questions are raised by this systematic viewpoint and the fact that not all can be answered readily at present is no criticism of the theory. At worst it is wrong; at best it may serve as a starting point for profitable experimental analyses of the problems in motivation and thought which arise from Freud's very stimulating statement of it.

Little gross change is observable in the treatment of dream-theory. The censoring function has been attributed to the super-ego and there is less emphasis on the strict interpretation of dreams as wish-fulfilment. It is conceded that many dreams, *e.g.*, repeated dreams of painful situations and dreams of disguised infantile sexual traumas, do not fit this interpretation; Freud suggests that dreams be considered rather as *attempts* at wish-fulfilment. When, for instance, there are opposed wishes relating to the same basic situation an anxiety dream may result. The anxiety derives from the ego, which sees its defenses against the repressed material crumbling, and the

ego is therefore aroused to combat the dangerous wish. In such case three wishes have been frustrated because conflicting wishes could not suffer symbolic fulfilment simultaneously; these wishes are the wish for sleep, the wish for bringing the repressed material to consciousness, and the wish (deriving from the super-ego) to express an attitude the opposite of the second wish. This is as satisfactory a statement as any of the origin of this type of dream, but if the cornerstone of pure wish-fulfilment is to be changed to *attempt* it would seem that the purposive aspect might be neglected in favor of some such description as that of Rivers, which considers quite adequately the conflictual nature of dreams.

Freud has dealt at some length with the possibility of thought-transference and gives a number of examples in which a psycho-analytic interpretation of the facts would induce to a belief in the occult nature of the experiences. He maintains an attitude of impartiality but the impression is strong that his judgment is opposed to the occult as an explanation.

Perhaps the least satisfactory presentation, from the point of view of either internal or external criticism, is that of the doctrine of instincts. A non-analyst cannot, of course, judge the validity of the observations on which it is based, although many of them have that curious quality of "striking homeness" which is so frequently characteristic of Freud's observations. He says, in opening his discussion, "The theory of instincts is, as it were, our mythology. The instincts are mythical beings, superb in their indefiniteness." In definition, "An instinct differs from a stimulus in that it arises from sources of stimulation within the body, operates as a constant force, and is such that the subject cannot escape from it by flight as he can from an external stimulus. An instinct may be described as having a source, an object and an aim. The source is a state of excitation within the body, and its aim is to remove that excitation; in the course of its path from its source to the attainment of its aim the instinct becomes operative mentally." If the confusion between "stimulus" and "instinct" is eliminated by recognizing the interoceptive or central nature of the so-called "instinct," the definition becomes a frankly purposive (and mentalistic) statement of the processes described by the reaction psychology concept "drive." While terminological confusion is always to be deplored, an entire concept need not be thrown out solely because of the inapplicability of its rubric.

Freud postulates two instincts, Eros and aggressiveness. The latter has two components, one directed against the outer world and

one against the self. The latter, which has been named the *death instinct*, Freud characterizes as a higher aspect of the catabolic processes fundamental in all living organisms. The theory of masochism is constructed on the basis of this tendency: erotic impulses become associated with self-destruction; submission to punishment by others is, then, an active self-destruction. Sadism is interpreted as the flowing outward of the destructive impulse (death instinct) after having been joined with erotic impulses.

The necessity for such an hypothesis depends on two groups of observations: one, masochism, and the other, the phantasies and behavior deriving from the death wish. It seems improbable that such a postulate is essential. Pavlov has shown, for example, that shock (which ordinarily produces avoidance reactions) can become the conditioned stimulus for salivation (one aspect of the approach reaction of eating). If this simple stimulus-response situation is translated into the more complex lust behavior of the human adult, masochism may be accounted for by the temporal juxtaposition of punishment and profuse affection in the child's early life. Thus one of the necessitating observations is eliminated. Secondly, many of the phantasies and behavior patterns which represent the so-called wish for death appear to be nothing more than emotionally over-determined wishes or efforts to escape from current emotional conflicts. Indeed, such phenomena as the assumption of the "fetal position" in sleep seem clearly indicative of regression as the specific method of escape. To the reviewer the death instinct is altogether too "superbly indefinite"; it is not required to describe the facts. As for the validity of the unitary *Eros* instinct, enough has been written in the past three decades to render further comment superfluous.

The chapter on "The Psychology of Women" summarizes in a somewhat disorganized way the observations of such analysts as Melanie Klein, Helene Deutsch and Anna Freud. These data have been derived largely from child analysis and the analytic treatment of women by women analysts. A number of tentative conclusions are drawn concerning erotic development during the infancy and latency periods but, while the need for this systematic presentation is obvious, it is apparent that woman is still a much more mysterious creature than man.

In the final chapter, "A Philosophy of Life," Freud casts his lot irrevocably with mechanistic science. The *Weltanschauung* suggested by psychoanalysis, he says, is the *Weltanschauung* of science

at large. His understanding of God as a father-imago, and western religion (at least) as an unscientific cosmogony and lay ethics, remains unchanged. Nowhere previously has he presented as clear and definitive a statement of the psychoanalytic interpretation of religion and the larger problems of systematic science. Indeed, whatever one may believe concerning the validity of Freud's psychological theories, his resolute statement of a personal faith in science—mechanistic science—as the key to fundamental truths and human betterment cannot but command the greatest respect.

Lorand's book, *Psychoanalysis Today*, is a collection of definitive articles on a number of psychoanalytic concepts. Several of the papers satisfy the current need for authoritative summaries of the literature on such points as dream theory, ego-id-super-ego, transference, origin of the neurotic personality and origin of the conscience. Separate papers are devoted to theories of each of the major psychoses and to the contributions of psychoanalysis to anthropology, criminology, literature, religion, organic psychoses and internal medicine.

Franz Alexander, in a discussion of the "ego psychology," clarifies briefly his own division of the super-ego into super-ego proper and ego-ideal (previously presented in his *Psychoanalysis of the Total Personality*). He makes an effort to link the psychoanalytic principles with conditioned response mechanisms.

Monroe Meyer gives a detailed statement of the entire dream theory with special attention to the mechanisms which operate in incorporating the "residue of the day" into the repressed material which, presumably, induces the dream. The excellence of Meyer's case examples will commend the paper to the attention of teachers of abnormal psychology. The careful description of condensation and displacement as mechanisms in the formation of manifest content clarifies a number of points which are all too frequently glossed over or ignored by academic textbooks and elementary treatises on psychoanalysis.

Psychoanalysis Today should serve as a useful supplement to Healy, Bronner and Bowers' *Structure and Meaning of Psychoanalysis*; both are excellent compendia of analytic facts for non-analytic psychologists. Lorand's collection is less systematic but more inclusive than Freud's book and, perhaps as a result, contains more reference to non-psychanalytically determined observations and theories. Both books are well indexed.

In contrast to the serious scholarship of these is Jung's *Modern*

Man in Search of a Soul, a series of popular essays on analytical psychology. Among them are the inevitable chapters on types, dreams and archaic man. There is no new material and the lack of an index is not troublesome.

ROBERT R. SEARS.

University of Illinois.

PILLSBURY, W. B. *An Elementary Psychology of the Abnormal*.
New York: McGraw-Hill, 1932. Pp. x+375.

Although Professor Pillsbury's book should prove valuable as a reference work for the beginning student, it does not seem well adapted to use as a basal text. It is written from a rather severe classificatory standpoint and fails to emphasize that continuity between normal and abnormal behavior which many modern students of mental pathology believe to be so significant. The Kraepelinian conception of the discreteness of mental diseases appears less valid today than when it was proposed, and its presentation in an elementary text tends to obscure the individual nature of symptoms of psychological abnormality. Such diagnoses as "dementia praecox with manic-depressive symptoms" have become not uncommon in some of our great research psychiatric hospitals and tend to further the belief that strict classification is not only of little value but of positive danger. To the beginning student the application of names to symptomatic conditions implies a discreteness of etiology and pathology which is by no means a surety to the research psychiatrist. The student tends to study the various disease categories and neglects the human beings behind them. Without constant emphasis on "the patient as a suffering human being" a dichotomy of normal and abnormal arises, and the intangible line of public opinion which actually marks off the normal man from the abnormal one becomes, to the student, a fixed and obvious wall of technically-named symptoms.

The classificatory approach has permitted Professor Pillsbury to be strictly psychologic, however, in his survey of the functional nervous disorders. He has successfully avoided any taint of mysticism or inept neurologizing, and presents a comprehensive and scholarly discussion of the many theories of the neuroses. The chapter devoted to Janet's concept of hysteria is particularly thorough and well-organized; it is marred, perhaps, by a somewhat uncritical acceptance of the dissociation hypothesis, but the positive attitude lends much to clarity and conciseness of presentation. Morton

Prince's abstruse theory of multiple personality is translated into non-technical language that brings the concept within range of the student's understanding. The illustrative material is very well-handled. The summary of Freud's point of view is rendered somewhat sterile by an unsympathetic attitude and an almost total neglect of the really significant contributions to developmental psychology. Individual chapters, uniformly accurate and readable, are devoted to genius, feeble-mindedness, sleep, and hypnosis, while a special chapter is also assigned to speech disturbances. Theories both of etiology and therapy are summarized concisely, and the mass of material in this most perplexing field, only too often neglected by the elementary texts, is made an integral and understandable part of abnormal psychology.

ROBERT R. SEARS.

University of Illinois.

INMATE WARD 8. *Behind the Door of Delusion.* New York: Macmillan Co., 1932.

The writer presents an autobiographical picture of life on the receiving ward of a state hospital for the insane. His career had been that of a successful newspaper editor, a respectable and influential member of the community, but a periodic craving for liquor led to a gradual deterioration. After a final protracted bout had produced a complete physical and mental breakdown, his associates had him committed to the state hospital in a last desperate effort to cure him.

He establishes himself frankly as a patient and gives a sketchy but vivid portrayal of hospital life from that point of view. The story's interest is enhanced by its saturation with the writer's own personality. The terror of being *locked in*, of being associated too long with deluded minds, of losing his own grip on sanity, of being released to a life of social ostracism, unite to give it a powerful overcast of fevered tension and anxiety. Such chapter headings as "Our Sane Insane," "Bars and Strong Arms," "Insidious Fears," "The Sterilization Spectre," indicate the tenor. Persistent and undirected fear haunts the writer and the book's chief value lies in its unintentional portrayal of his character. He is egocentric in the extreme; there is no insight into the nature of his fellow-patients' disorders, no feeling for or empathic understanding of their troubles. His sympathy is perfunctory, unconvincing, but his descriptions of their behavior are possibly more valid for that reason. Although the style

is repetitious and melodramatic, the book has an air of decided authenticity which should make it a worth-while presentation for the layman. It is definitely not in a class with the books of a similar type by Beers, Hilyer, and the author of "Invert."

ROBERT R. SEARS.

University of Illinois.

KING, C. DALY. *The Psychology of Consciousness.* New York: Harcourt, Brace & Co., 1932. Pp. xv+256.

This book purports to present a new technique for psychological observation, which the author calls "self observation." He dismisses with a word the behavioristic and introspective methods, the former because it ignores consciousness, the latter because it is so "unscientific," and deals with content. This new technique is heralded as completely scientific and objective because it is the observation of our own bodies which are objective things, and in the process one is supposed somehow to become acquainted with the real "I" through the method of "non-identification"; by which is apparently meant separating one's self from one's body by "effort, effort and more effort." Yet this process "does not require thought," nor attention in the psychological sense, and the effort is not of any known variety. The author finds a neurological basis for his system in Marston's psychonic theory, whereby consciousness is identified with the functioning of synaptic tissue.

Frankly, this book is one of the most preposterous jumbles of amateurish pseudopsychological tosh that has appeared on the list of a supposedly reliable scientific series. The author has jumbled together Yoga philosophy, a confused Bergsonian intuitionism, and a hopelessly naïve interpretation of established psychological systems. Yet he has somehow written the early part with a thin veneer of surface plausibility so that we are actually led on halfway through the book, before its fundamental absurdity dawns on us. Thus, only, can we excuse the publishers for letting it get by their staff.

If any doubt exists that our evaluation is correct, consider these quotations:

"On the possibility of a non-identification between 'I' and 'I's' body rests the possibility of I's existence as more than a self-deluded concept or semi-hysterical thought-process."

"If not only are our bodies mechanical but if also we are unconscious of their detailed behavior from moment to moment (as is the plain fact), then we are practically somnambulists. And if now we become, through conscious effort, actively aware of our bodies for a few seconds at a time, we are at least

beginning to wake up though we remain predominantly asleep. Only when we are able to be conscious of them in all respects and continuously, shall we have self-consciousness. Not to run away from the implications here involved this means ultimately awareness of cells and intercellular phenomena within the body. . . . A cautious inquirer will refrain from premature hopes concerning the state called death, but such a beginning would be at least in a desirable direction."

Statisticians will be interested in the following: "all the correlations were below .5, which is the point above which significance begins, since .5 represents only a 50-50 chance of relationship between the elements correlated."

ARTHUR G. BILLS.

University of Chicago.

GAULT, R. H. *Criminology*. New York: D. C. Heath, 1932.
Pp. ix+461.

Professor Gault has divided his book in two parts, The Criminal Personality, and The Struggle Against Crime. Part I comprises a psychological discussion of the criminal himself from both the individual and statistical standpoints. The first chapter surveys the historical background of criminology, and the next three are devoted to affective psychology. The remaining ten chapters consider the relation of criminality to various causative (or associated) factors such as intelligence, mental disease, age, etc. The writer has performed a great service in summarizing the mass of conflicting experimental and statistical studies of these factors. The chapter on criminal physical anthropology, in particular, is brief, thoughtful, and succinct in its verdict. The more important studies of criminal intelligence have been abstracted and discussed as to techniques and errors as well as findings. It is a relief indeed to have this disturbing problem presented in summary form. The sections concerning the relation of mental disease and crime lack somewhat the strong experimental and factual flavor of the previous chapters, but, by presentation of illustrative case histories, safely avoid dogmatism. Separate chapters are devoted to the relation of race and sex, age and physical health, "attitudes," gang environments, and heredity.

In Part II are considered the problems of criminal treatment, methods of detection, and criminal court procedure with reference to the theory of punishment. The effectiveness and value of parole and probation are analyzed and the factors underlying their successful use are demonstrated by a number of statistical researches. The all-too-brief chapter on detection by methods of precision presents a fas-

inating survey of the various techniques used by the modern police force. The writer has chosen wisely, of course, in avoiding a comprehensive description of these techniques in a general text-book.

Although criminology appears to be applied Science, Professor Gault's book serves to give it standing as a distinctly individual field in itself. From ethics it draws the problem of the theory of punishment and from sociology the justification for solving it. Progress to date is admirably summarized in *Criminology*.

ROBERT R. SEARS.

University of Illinois.

CREED, R. S., DENNY-BROWN, D., ECCLES, J. C., LIDDELL, E. G. T., and SHERRINGTON, C. S. *Reflex Activity of the Spinal Cord*. Oxford, 1932. Pp. 183.

With the exception of a Hughlings-Jackson lecture, this is the first systematic presentation of Sherrington's investigations since the appearance of *The Integrative Action of the Nervous System* in 1906. Unlike many of his contemporaries, the recent Nobel prize winner publishes but seldom outside the technical journals. Students of nerve physiology will welcome, therefore, this brief summary by him and his workers (the responsibility for bringing together the individually written contributions rested with E. G. T. Liddell).

The book succeeds fairly well in giving a concise account of the elementary features of reflex-action as illustrated particularly in the spinal dog. The presentation is confined to the reflexes of the skeletal musculature, mainly those of the hind limbs. There are two introductory chapters, one on the *reflex arc* and the other on the *spinal gray matter*. Typical reflexes are then discussed *seriatim*. Chapter 3 deals with the *flexor reflex*; chapter 4 with the *scratch reflex*; chapter 5 with *extensor reflexes*; chapter 6 with *central inhibition* (in contralateral reflexes); and chapter 7 with *lower reflex coördination*. There is an appendix devoted to the muscle receptors, a bibliography suited to students "who are accustomed to consult (only) works written in English," and a brief index.

While this book is of much more limited scope than the *Integrative Action*, the majority of descriptive principles remain the same. Subsequent research has not deviated seriously from the lines laid down in the early part of the century. Reciprocal innervation is postulated for all antagonistic muscles; and the only notice taken of the Tilney and Pike, Dodge and Bott results on co-contraction (the papers are not specifically mentioned!) is the argument that this condition

obtains only in *pseudo-antagonists*. A feeble attempt is made to relate Sherrington's chemical theory of central excitation and inhibition with the now widely accepted membrane theory of nerve excitation. New terms are occasionally substituted for old ones. *Immediate spinal induction* is now referred to *plurimuscular combination* and *fractionation at the reflex center*. Two excitatory afferents which fractionate the same *motor-neurone pool* may cause response decrement by *occlusion*. Many points would be clearer, perhaps, had some mention been made of correlative clinical evidence in man. Especially is this true for the "student of medicine," to whom the book is primarily addressed. Such omission has its advantages, however, in that it does not cumber a purely experimental argument. Implications are confined where they should be to the integrative action of the spinal cord. Even these are restrained.

"In some degree . . . a fundamental principle emerges. That important and practically omnipresent factor in coördination, namely, adjustment of quantity of contraction, presents itself (and the more so as the scale of reflex complexity is ascended) as the resultant commonly of two interacting antagonistic central processes, excitation and inhibition. The degree of activity of a motoneurone corresponds with the algebraical sum of the opposed influences of excitation and inhibition convergent upon it."

This type of sober presentation is, in the reviewer's opinion, the most commendable feature of the book. No attempt is made to relate the principles of reflex action to the 'behavior' or 'conduct' of the intact organism. Perhaps Sherrington has learned a lesson here. The few generalizations which he permitted himself in his *Integrative Action* have been taken very naïvely, not to say loosely, by many individuals, especially the psychologists. One has only to recall the fearful and marvelous ways in which reciprocal innervation has been made to explain everything from why attention fluctuates to the origin of consciousness to realize how discouraging such manhandling can be to an oriented student.

G. L. FREEMAN.

Northwestern University.

WESTERMARCK, EDWARD. *Ethical Relativity*. New York: Harcourt, Brace and Co., 1932. Pp. 18+301.

In his *Origin and Development of the Moral Ideas*, published twenty-five years ago, Westermarck was a Darwin for presentation of fact in substantiation of his thesis of ethical relativity. But the very bulk and glamor of the facts—the mores of other peoples—served

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to conceal, as much as to prove. He has therefore chosen to re-present his thesis, further developed and without so much distraction.

Intuition and self-evidence are the foundation-stones of most objectivisms. Sidgwick, for example, considers it self-evident that "I ought not to prefer my own lesser good to the greater good of another." Westermarck, however, denies the self-evidence of this or any other proposition—its self-evidence, that is, to everyone. And he rejects the possibility of universal standards; for ethical beliefs are the derivatives not of intellectual intuitions but rather of emotions. And emotions are personal and relative things.

Moral concepts are rooted in the retributive emotions, defined by Westermarck as "either a friendly attitude towards a person as a cause of pleasure or a hostile attitude towards a person as a cause of pain"; characterized further by disinterestedness and impartiality. The concepts of right and duty spring from the emotion of disapproval; the concept of good from approval.

Such a view of morality does not make for chaos. And it is the one view which makes progress possible. Nevertheless, the intuitionists are sure not to be dislodged by Westermarck or anyone else—so precious and certain are intuitions. We may in fact confidently expect an acceleration of the flow of objectivisms from Oxford.

L. M. PAPE.

University of Chicago.

Book, WILLIAM F. *Economy and Technique of Learning*. Boston: D. C. Heath and Company, 1932. Pp. x+534.

The title suggests a book devoted wholly to the technique of economical learning, but the first 308 pages are devoted to a description of the learning process.

In this description, conditioning plays a very large rôle, accounting for the development of all habits, concepts, abstract ideas, and most interests. Even in creative learning it selects or develops the new adaptive responses. It does not, however, account for the first appearance of the new adaptive response.

There are, in other words, two "rather distinct" learning processes: (1) "the mere formation of habits," and (2) "creative learning." The learner should pass from the first to the second as soon as possible. The change is said to consist of a "reversal of stimulation." The learner acquires "the ability to stimulate himself." The two phases "may, however, be developed together." Creation is variously attributed to "insight," "intelligence," "purpose" and "self-stimu-

lation," but its exact nature "is not fully understood." What "seems certain" is that "it is an integrative process that somehow completes itself as the stimulus situation, or learner's problem, is being worked over."

The theory is avowedly a combination of "habit formation" and "configuration." In the opinion of the reviewer, the emphasis, whether intentionally or not, is upon habit formation. One of the strongest convictions expressed in the book is that "a learner has nothing to carry into the new experience or to use in making the new and desired responses except his old experiences, the habits and skills he already possesses."

The treatment has the strength which comes from the author's valuable knowledge of the acquisition of skill. On the other hand, the descriptions of perceptual and ideational learning are correspondingly weak. In logic, the book gives the impression of not being a finished product. There are apparent inconsistencies. There are classifications into mixed categories. There are what seem to be unrecognized repetitions and the book seems unnecessarily long.

"As a text for teacher-training courses," the most valuable part of the book is Part V, "How to Make Learning Most Economical and Efficient." The eight chapters of this part, with the two earlier chapters on motivation, have valuable and far-reaching implications for school practice.

The book is admirably summarized in the final chapter.

J. W. TILTON.

Yale University.

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THE MOOSEHEART CONFERENCE

BY RUDOLPH M. BINDER

East Orange, N. J.

The Mooseheart Conference on Child Development, Care, and Training met in Washington, D. C., on February 22, 23, and 24, 1934. Ten papers were read and several addresses were made. A radio address was also given by Dr. Martin L. Reymert.

The Hon. James J. Davis, U. S. Senator from Pennsylvania, was Honorary Chairman, and Dr. Martin L. Reymert, Director of the Mooseheart Laboratory for Child Research, maintained by the Loyal Order of Moose, was Chairman.

After being introduced as Founder of Mooseheart and Director General of the Loyal Order of Moose, Senator Davis stressed the importance of the work at Mooseheart, the "City of Childhood," during its twenty years of existence, not only for the orphans and widows of Moose, but for the educational world as a whole, because the all-round study of children, made under ideal and controlled conditions, was producing many results of the utmost value for psychologists, sociologists, and especially for educators.

Dr. Reymert called attention to the following facts: that approximately 1,000 graduates had gone out from Mooseheart; that the children were mostly normal but a few subnormal, as in any community; that between 1,200 and 1,400 children had been cared for annually during the last eight years; that they came from places as widely apart as Alaska and Colon, Panama, and from every racial element of our population; that the training they received was embracing every aspect of human nature, but always adapted to the individual child; that the average stay of a child is eight years, although a considerable percentage stays from twelve to sixteen years. This long stay and the absolute control over children, exercised most humanely and never autocratically, makes it possible for Mooseheart to study every child individually, longitudinally as well as cross sectionally.

This address furnished the key to the conference, and every speaker, each of whom had become acquainted with Mooseheart by visiting it, expanded on some special aspect of the research program.

Dr. Edgar A. Doll of Vineland, New Jersey, emphasized that the White House Conference on child welfare had brought out that there

were too many gaps in our knowledge of children, because in most of our studies the period investigated was too short or the number of children too small. He decried the too factual trend of education and pleaded for greater emphasis on imagination, in his paper on *Future Clinical Research on Children*.

The place of Dr. Paul L. Schroeder of Chicago was taken by his associate, Dr. James P. Molloy. His discussion of *Psychiatry and the Modern Child* brought out that mental diseases of adults had their root in childhood and must be studied there from every angle—physical, emotional, intellectual, and social, possible only under a controlled environment over long periods, as in Mooseheart.

Dr. Louise E. Stanley spoke on *The Importance of the Mooseheart Laboratory to a Nation-Wide Parent Education Program*, such as has been recently inaugurated by that institution.

Dr. Charles H. Judd of the University of Chicago took up this thread in his paper on *Research in the Field of the Psychological Development of the Child*, by stating that the new field of mother training was most essential, because few children had the advantage of those at Mooseheart in being studied from every angle over a long period of years. Most of our studies of children are fragmentary; they have been either those of infants or those of adolescents—the long period in between being still a *terra incognita*, although a most important transition period, because during these years docility disappears and self-assertion begins. Owing to the necessarily fragmentary control of the schools over children a nation-wide training of mothers with its continuous control is not only expedient, but necessary.

Dr. T. Wingate Todd of Western Reserve University also deplored the fragmentariness of school records, at least in large cities, in his paper on *Physical Growth of the Child*. In one school 800 children were examined in one year. Of these 400 had been "lost" the next year; in another school 750 children out of 800 had been "lost" within two years. Physical growth and especially the qualities of patience, aspiration, and perseverance can be studied only over long periods of time with continuous records.

Professor John E. Anderson of the University of Minnesota read a paper on *Research on the Child, a Retrospect and Forecast*. He claimed that our study of childhood had undergone a radical change within the last decade in volume, methods and technique, and that longitudinal studies were now considered the absolute *sine qua non* in this field.

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Dr. Aleš Hrdlička of the Smithsonian Institution spoke on *The Mooseheart Colony: A Rare Opportunity for Anthropological Child Study*, since different racial elements could be studied there over long periods of time with a sufficient number of subjects to be of real value.

Dr. A. C. Prosser of Minneapolis presented a paper on *Vocational Adjustment at Mooseheart*. He referred to the pre-vocational training at Mooseheart as a most excellent procedure, since it not only furnishes an opportunity to the boys and girls to try themselves out before making a final choice of occupation, but makes each one familiar with the tools of a particular group. And this familiarity is most essential in a constantly changing industrial world in which old occupations are abandoned and new ones arise almost overnight. Self-reliance can come only from ability of adaptation to such changes.

Dr. Borden S. Veeder of Washington University, St. Louis, substituted for Dr. H. F. Helmholz, and read a paper on *The Growing Child as a Problem in Pediatrics*. This field of knowledge no longer confines itself to diseases of children but tries to include every factor entering into the development of the child, and endeavors to integrate these various factors so as to get a complete picture of the child as a whole.

Professor E. W. Burgess of the University of Chicago spoke on *The Growing Child in the Family and Play Group*. The circle to which adjustments must be made by a child is constantly widening from the family to the play group and the school and eventually to society. The most important adjustments are those to the family and the play group, because they largely determine those made later to the larger groups.

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